JPRS 79496

20 November 1981

USSR Report

ENERGY

No. 81

FBIS FOREIGN BROADCAST INFORMATION SERVICE

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LENINGRAD TURBINE CONSTRUCTION REPORT

Leningrad LENINGRADSKAYA PRAVDA in Russian 13 Aug 81 p 2

[Article by A. Travin: "Nuclear is Fastest"]

> [Text] Today, this turbine--and none like it has yet been built in our country--is emerging from the realm of creative planning, design and technological work-up onto the highroad of production. A new stage in the creation of a new piece of machinery with a million kilowatts of capacity has evolved in the "Leningrad Metal Plant" [LMP] association. The Herculean turbine is destined for the Rovenskaya AES now under construction and is a most important part of the Leningrad contribution to the further development of the fuel-energy complex.
>
> The unusually high regard accorded this machine isn't for nothing. The appearance of such turbines in the nation's energy arena (in the current five-year plan, the association must not only produce the pilot model but also has to augment its potential to the point where it can deliver turbine equipment for nuclear power capacity of several million kilowatts annually) will make it possible to solve a problem of paramount importance. At nuclear stations where there are today reactors and generators with a million-kilowatt capacity there are, as a rule, two "five hundreder" turbines. This leads to large production areas and increased construction cost and operating expense. A real and urgent need has arisen to provide the nuclear stations going up in accordance with the new plans with combined "reactor-turbine-generator" machinery in which the components are totally mated. And the "millioner"-turbine being birthed in Leningrad is the last missing link.

One of the most important elements of the LMP design school, according to V.K. Ryzhkov, chief designer of the association's "Turbina" Special Design Bureau, is extensive unification, the carryover of the best from basic turbine models to the improved types. It is therefore natural that the nuclear "millioner", designed under the tightest of deadlines, has incorporated all the best that is in such a well-known turbine as the K-1200. This ensures its high technological effectiveness and the opportunity to begin fabrication with existing equipment, without any revamping of production.

Quite a few original ideas have also been embodied in the turbine. New solutions were implemented respecting the high pressure cylinder and its flow was much improved. The "millioner" has integral disk rotors, not welded rotors. This makes for a sharp reduction in metal consumption; the production cycle is reduced from 2 years to 8-9 months and cost is reduced a third.

But the main advantage of the "millioner" turbine is its speed: the higher the revolutions per minute the less the cost to produce it. In comparison with a slow-running version of a machine with the same output, the high speed turbine is hundreds of tons (or 20%) lighter. It is therefore considerably more compact, shorter by 22 meters.

Our power engineers are very much looking forward to this machine, of course. Its fabrication is being closely monitored by operational supervisors, the party committee, and by a coordinating council which was specially created in the association and directs the activities of all units and all participants in the turbine's production.

The new machine is not being born under hotnouse conditions. Those responsible for its creation are at one time striving for the plan, for quality of the new machines in production, and for the reduction of installation times at dozens of electric power stations here and abroad. And nobody is letting himself relax. It's not compatible with the creative push of the turbine builders, the spirit of socialist competition under the motto, "From high quality of the work of each one to high effectiveness of the collective's labor!"

When lathe hand Ivan Yerokhovich had masterfully turned it, the rotor of the high pressure cylinder was dispatched from the 28th shop of the "LMP" association to the "Izhorskiy Plant" association. Its heat treatment is being finished up there now. The rotor will go back to the turbine builders this month. The technology for finishing it off has been worked out and lathemen Vasiliy Pavlov and Aleksey Sheshenin are ready to carry out that critical assignment.

It won't be too long before the 7-meter-tall high pressure cylinder is assembled. But the turbine builders don't have a vertical boring and turning lathe with an upper carriage high enough to handle it in assembled form. What's to be done? It will take too much time to modernize one of the existing vertical lathes.

And then, with calculations to back up their proposal, engineers G. N. Ul'yanov, B. M. Dudakov, V. A. Tumanovich and V. V. Tertyshnikov proposed using an NS-63 boring machine. And although its operating principle is directly opposite that of the "vertical mill", where the workpiece is rotated and the tool is fixed (everything here is vice versa), the result will be the same if the boring bar is remodeled and precision tools and fixtures are used. So engineers Ul'yanov, Dudakov, Tumanovich and Tertyshnikov are working as a creative team, bringing their unusual suggestion to fruition.

Many, too, are the responsibilities of N. N. Bogomolov, head of the fifth blank cutting shop. At the end of August and in September the metal cuttings needed for fabrication of the turbine condenser and its discharge components will "get going". The equipment in the shop is most up to date--apparatus with numerical program

control. To whom is entrusted the processing of these hundreds of tons of metal? One who best handles the modern equipment, one who has achieved the highest results in socialist competition. And that means Boris Ivanovich Filatov's crew of cutters.

"We will live up to that trust," quoth the crew chief. "The mechanics who assemble the metal structures of the low pressure cylinders from the cut out pieces will bear my comrades no grudge."

The turbine builders work with a great sense of responsibility. The high pressure rotor and many units of the four low pressure cylinders and the condenser will be produced at the "LMP" association during the first year of the five-year plan considerably in advance of deadlines. And in December of next year, on the occasion of the enterprise's 125th birthday, the association collective will present to its customer the nuclear "millioner"--first-born of the new series. That is why the pace of operations is already quickening in the shops and the sections already involved in its fabrication. All of the turbine builders' actions are governed by an urge to speed up the creation of the machine, to more quickly translate it into metal. And they are not alone.

The collectives of the "Izhorskiy Plant" association and the "Turbine Blade Plant" imeni 50th USSR anniversary association are participating with them in the production of the unique turbine.

"Our partners," says A. P. Ogurtsov, chief engineer of the "LMP" association, "have more than once demonstrated their high professional capability through their work, outstanding quality and early fulfillment of contractual obligations. Now, though, if special measures aren't taken there may be a snag."

It has to do with the low pressure rotors. The first and second will arrive at the Metal Plant in September and December, following heat treatment. But the metal for the third and fourth hasn't been poured into the molds although the deadlines have passed. And if the turbine builders don't get the rotors from the Izhorskiy people on time, the fabrication of the turbine will come to a halt and the production cycle will be disrupted.

"That's true," explains Yu. V. Sobolev, chief engineer of the "Izhorskiy Plant" association. "We've been filling a lot of 'Elektrosila' orders. But let not our Metal Plant colleagues be troubled. A special schedule has been drawn up and approved by the deputy minister; the third and fourth low pressure rotors will be ready--one in January and the other in February. The turbine builders will stay within their deadlines."

And they are as follows: The low pressure cylinders have to be assembled in the first quarter of next year. Titanium alloy blades are needed at the same time. But the specialized sections for processing them have not gone into operation at the "Turbine Blade Plant" association as proposed.

"The planners of the power machinery construction institute didn't issue the documentation for establishment of the specialized sections at the proper time," states the enterprise's chief engineer, V. N. Kokin, "and "LMP" association lagged on development of the plan of the apparatus for the blades' barrier coatings. The doc-

umentation is now in being, but time has been lost. To get out of this situation it's necessary to find a new technical solution to turbine blade processing which is mutually satisfactory to LMP and to our association.

So, probably, specialists of the enterprises in question have to be called in. And the sooner the better.

Not everything is going as smoothly as you please at the Metal Plant either. In the 33rd shop, equipment for a specialized electron beam welding section where blade sets are to be welded is being held up. A number of numerically controlled machine tools for processing "millioner" parts have not been installed in the 11th shop.

In a new business, particularly such a big one as the production of high-efficiency equipment for nuclear power, it appears that road blocks are a possibility. But the party committee and the operational supervisors certainly will be able to focus the creative efforts of the collective on elimination of the deficiencies, on a new upswing in production, and on upgrading the efficiency and quality of the whole operation.

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CSO: 1822/8

ELECTRIC POWER

AES PUMP CONSTRUCTION REPORT

Kiev RABOCHAYA GAZETA in Russian 29 Aug 81 p 4

[Article by P. Vorona, candidate of technical sciences, director of the All-Union Scientific Research Institute of Nuclear and Power Engineering Pump Construction (Vsesoyuznyy nauchno-issledovatel'skiy institut atomnogo i energeticheskogo nasosostroyeniya), Sumy: "For Nuclear Power Engineering"]

[Text] During the 10th Five-Year Plan, in accordance with our designs, the nation's enterprises assimilated series production of 32 new products with an economic effect of 20 million rubles. Among these was a series of unique feed, condensate and other specialized pieces of machinery for the fifth unit of the Novovoronezhskaya AES with a water-moderated, water-cooled 1-million-kilowatt reactor. For the first time in native nuclear power engineering practice the institute developed a turbine feed pump with a 12,500-kilowatt drive. The machine was built by the workers of the divisions headed by communist Anatoliy Il'chenko, Yevgeniy Yankin and Konstantin Liashchin.

These collectives have many creative accomplishments to their credit. At the first nuclear electric power stations low output pumps were used to feed the first loop and they were, moreover, not noted for their operational reliability. The institute's specialists were handed a problem--develop in a short period of time a fundamentally new centrifugal pump with a hydraulic coupling, having a built-in booster for smooth regulation of the operating parameters. The collective solved the problem successfully, having developed a piece of equipment on a par with the best foreign models. Whereas six or seven piston pumps supplied the unit heretofore, just one of the new machines suffices now. Its operation can be regulated by means of an automatic control system. Vladimir Val'chuk, Eduard Cherednichenko, Leonid Stegno and others distinguished themselves in working out these innovations.

Pumps for the safe operation systems of nuclear power stations have also gotten more reliable. The condensate units built specially for the Novovoronezhskaya station are distinguished by high discharge capacity and quality. They incorporate several innovations for which certificates of authorship have been issued.

During its 25-year existence the collective of the All-Union Scientific Research Institute of Nuclear and Power Engineering Pump Construction has made an appreciable contribution to the development of native pump construction. The machines developed by our scientists have been evaluated highly not only in the Soviet Union

but in many foreign countries as well. In recent years we have concentrated on creating economical and reliable pumps with high unit capacity. As a result, the extent of saving with respect to the machines has risen 15% and service life has more than doubled. Enlarging the pumping equipment makes possible not only a substantial reduction in the time it takes to install it. Calculations for units with a capacity of 900 megawatts have shown that the enlargement of the auxiliary equipment knocks down the estimated cost of a thermal electric power station by almost a million rubles. In addition, there is a savings of 1200 tons of metal and 30,000 tons of conventional fuel.

The list of implemented developments authored by our collective grows constantly.

The modernization of the feed pump for the Rovenskaya AES will boost the annual production of electric power by each unit by nearly 4.4 million kilowatt-hours.

For oil pipelines in the regions of West Siberia the institute's people developed a special pump suited for operation at minus 50 degrees. The past year saw the production of the first industrial series of main-line pumps with a capacity of 12,500 cubic meters of liquid per hour for the Surgut-Polotsk pipeline. These were unitized versions displaying improved factory-readiness. The application of this innovation about halves the labor needed for the installation of oil pumping stations. It takes 3500 railroad tank cars to transport the oil pumped in 24 hours by a station equipped with these pumps.

In the Basic Directions for the country's economic and social development during the 11th Five-Year Plan and on to 1990, approved by the 26th CPSU Congress, much attention has been devoted to the continued growth of fuel and energy potential. The efforts of our institute's people, too, are focussed on the urgent solution of this important national problem. During the current five-year plan we aim to develop and introduce new and better pumping equipment for nuclear and thermal electric power engineering, for the extraction and transport of oil, for high-volume mineral fertilizer production lines and for other sectors.

In order to ensure high technical and economic ratings for the new equipment, research will be carried out to study the hydrodynamics of the flow section working process, to develop seals able to withstand high pressure and high temperature and so on. It is also planned to develop machines for power units of nuclear stations with reactors of 1.5-million-kilowatt unit capacity. The first of these are to be shipped to the Ignalinskaya AES next year.

We will also devote a lot of attention to modernizing and improving existing equipment. We've already begun development of a new-generation high-rpm turbine feed pump for series units of nuclear stations with water cooled and moderated reactors with a unified thermal system. Thanks to the implementation of a number of progressive design decisions, the metal content of pumps of this type will be reduced to two-fifths the former amount. An improvement of just one percent in the efficiency of electric power machinery reduces annual power consumption by stations for their own needs by nearly 5 billion kilowatts, which equates to saving 50 million rubles.

Competition for the early realization of the aforementioned plans is widespread among the institute's personnel. In the vanguard are Valentin Zhukov, Arkadiy Ivanyushin, Vladimir Moskalenko, Vitaliy Mikitenko, Nikolay Tkachenko, Vladimir Khlebchenko, Yevgeniy Petrenko and many others.

Mobilizing their efforts to bring to life the decisions of the 26th CPSU Congress, our people have vowed to develop more than 30 new types of pumps in the 11th Five-Year Plan. With the series introduction of them the national economy will save more than 25 million rubles a year.

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CONSTRUCTION REPORT ON BALAKOVSKAYA, ZAPOROZHSKAYA AES

Moscow STROITEL'NAYA GAZETA in Russian 21 Aug 81 p 1

[Article by K. Chegin (Balakovskaya AES), and by G. Antonyan, deputy chief of the Zaporozhskaya AES construction administration, and V. Chentsov, chief of the labor organization and wages division: "Two Construction Projects Are in Competition"]

[Text] The Basic Directions approved by the 26th CPSU Congress call for 24-25 million kilowatts of new AES capacity during the new five-year plan. The active pursuit of high-speed flow-line construction methods on these projects will be required in order to fulfill the energy program.

Balakovskaya AES

At the Balakovskaya AES you won't at first discern the little housing cars commonplace at every construction project. There are a few of them scattered among the buildings of the production facility. But, as A. Ivanov, head of the Promstroy-1 [Industrial Construction] administration of Saratovgesstroy [Saratov Hydroelectric Power Station Construction Trust], explained, they will soon be disposed of and the builders will move into major housing accommodations. Each brigade will have a locker room and a room for receiving food. There will also be showers, a medical station and feminine hygiene rooms. The building for a 300-seat dining hall has already been erected nearby.

Not just the organization of everyday living is being approached competently and thoughtfully here. The project began with paving of permanent roadways, engineering communications and the establishment of the production facility.

The Balalkovskaya AES will be the first nuclear electric power station in Volga country. It is one of a new-type AES family. Its "parents" are the Zaporozhskaya, Rostovskaya, Tatarskaya and Bashkirskaya stations. Like them, it will have the economical "VVER-1000" reactors, new-type turbines and "millioner" generators.

With Promstroy-1 chief A. Ivanov and party committee secretary A. Volkov, we ap the site of the station's reactor section. It will in time rise 70 meters high, but the builders at zero level. They poured the concrete foundation slab for the first reactor during the winter. And despite the severe conditions the first unit (5500 cubic meters)was done in 4 days and the second (6500 cubic meters) in 5 days.

"We handled this operation faster than the Zaporozh'ye people did," says A. Ivanov. "While it is getting things rolling on other AES objects, Saratovgesstroy is trying to finish up jobs for other customers faster. The object is to free up hands, to have the opportunity to concentrate all forces and all resources on the nuclear station. Under the decisions of the 26th Party Congress, we are obligated to see that its first unit starts up no later than 1984."

Zaporozhskaya AES

The Zaporozhskaya AES is the head plant in a series of nuclear electric power stations with water cooled and moderated VVER-1000 reactors (six unified power units). The first unit should go into operation 4 years after start of construction--in 1983, with succeeding units to start operating thereafter no more than 12 months apart.

The prefab slab method of construction is being used for the reactor section and special structure. The production of the reinforced concrete slabs for the unit compartments in a special concrete form ensures a high quality of the slab face, ready for painting. The system of centralized delivery of structures and materials, the performance of materials record-keeping and moving operations with computer assistance, and an automated system of object listing and technical documentation processing are serving to considerably curtail labor input and increase labor productivity.

A two-element management structure was a ced for construction operations: construction management (based on legal rights of a trust)-construction sectors. Because of the elimination of intermediate elements, outlays for staff maintenance have been reduced by 180,000 rubles a year.

Much is being done to upgrade the quality of operations. The job contract plus bonus system now widespread in construction sometimes leans the workers toward trying to shorten the standard times allowed for work performance, to the detriment of quality. It was decided to try out a job contract plus bonus wage rate system. The job contract is an assignment to perform a specific set of operations or types of work within a set time. We specify the calendar deadline based on the brigade's (unit's) output during the last 3 months. The bonus rate is set at 30% of wage for performance of the assignment with a work rating of "excellent" and 40% with an "outstanding" rating. No bonus is paid for "satisfactory". Having experimented with it in several brigades and gotten positive responses from the workers, we have extended the job contract plus bonus wage rate system to the whole project.

One other important innovation is the switch from brigade contracting to sector contracting. There is less discord in the activity of allied brigades, and output (by up to 20%) and wages go up.

Outstanding ratings are being achieved by the contracting collective for mechanized earth moving and hauling under the supervision of V. Smetanin, which combines the movers (bulldozer, excavator, grader and pneumatic roller operators) and the dump truck drivers. In process now are preparations to organize an enlarged comprehen-

sive brigade for mechanized placement of concrete. It will include the concrete plant workers, concrete pump operators, the concrete transporter drivers and the concrete workers who pour the mix. According to calculations, such a collective will place up to 800 cubic meters a day.

> The builders of the Balakovskaya and Zaporozhskaya nuclear stations are now endeavoring to borrow each other's advanced experience. At Balakovo, for instance, they've begun using metal lattice for a nonremovable form, after their colleagues' example. And they themselves have much one can borrow that is good too.
>
> But contact between the projects is still slight and casual. Meanwhile, the builders of the two identical nuclear stations have at their disposal ideal conditions and opportunities to organize a project-to-project competition. It is especially important to organize a rivalry-collaboration at the level of the brigades and sectors doing the same work, and to carry on work-information exchange among them.
>
> Using the example of the stations, the trade union committees can develop a procedure and a model for pair competition combined with complex competition for related projects, based on the "worker relay race" principle. The Central Committee of the electric power station and electrical equipment industry workers trade union must devote special attention to this possibility.

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CSO: 1822/8

ELECTRIC POWER

ODESSA NUCLEAR TETS CONSTRUCTION START

Moscow TRUD in Russian 28 Aug 81 p 1

[Article by Ye. Zabortsev: "The Odessa Nuclear"]

> [Text] Construction of the nation's largest heat and electric power station has begun not far from Odessa. It will furnish heat and hot water to the city's residential areas and industrial enterprises and will also feed electricity into the Unified State Power System.

Representatives of 20 organizations have convened to build the nuclear TETs. General contractor is "Yuzhenergostroy" [Southern Power Engineering Construction Trust], whose people have extensive experience in the erection of such objects.

It is planned to install two water cooled and moderated reactors and four heat conditioned turbines of a half million kilowatts capacity each. Water heated to 145 degrees will go from here via thermal networks to booster pump stations and into so-called peak boilers where it will be heated up and diluted to the required temperature. Then the heat and hot water will go directly to users.

"A special complex of measures will assure total safety in using the nuclear heat and electric power station," states its director, V. Dubetskiy. "The station will be equipped with apparatus to guard against malfunctioning of systems for normal operation. Each unit will be enclosed in a special reinforced concrete shell built with pretensioning of the reinforcement. The shell will contain both the basic equipment and the auxiliary systems All this will make it possible to completely preclude radioactive contamination of the environment and reliably shield personnel from radiation. Operation of the nuclear TETs will consequently be just as safe as an ordinary boiler station.

When this TETs gets up to planned capacity it will be possible to do away with more than 450 small boiler stations which are located mostly in the central areas of Odessa. Their furnaces now burn some 2 million tons of scarce organic fuel annually and their stacks expel about 35,000 tons of ash into the atmosphere. The use of the peaceful atom will therefore not anly save considerable coal and oil but will also help keep the city's air clean.

Extensive preparatory operations have now gotten under way at the building site. Builders are rushing to finish priority projects: a 22-kilometer branch railroad line from Vygoda to the TETs; a deep-water moorage for reception of cargo on the Dnestr; a concrete plant and the first two high-rise residential buildings for the power workers. Over 1.5 million rubles has been appropriated in the 3 months since construction started. This is much more than was envisioned by the plan.

Among the leaders in competition is the complex brigade headed by the experienced power builder, V. Paramonov. At the concrete plant construction site the brigade members are fulfilling shift assignments at a 170-percent rate and with outstanding quality of operations. They will soon be faced with starting installation of the reinforcement and pouring of the first cubic meters of concrete in the foundations of the station buildings.

The bulldozers roar and the heavy dump trucks, straining, howl beyond a small grove on the plain. The pace of construction on the Odessa TETs is quickening daily. It is planned to put its first section--with a capacity of a million kilowatts--in operation in 1985.

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BRIEFS

AZERBAIJAN GRES--Minchegaur, 10 Sep 81--The builders of the Azerbaijan GRES, activation of which is specified in the Basic Directions for the nation's economic and social development, report great production success. The year's plan for construction and installation work has been fulfilled ahead of time. All the GRES building operations go on around the clock and there's victorious news daily from the various sections of the site along the Minchegaur reservoir shore. Installation of a 15-story-high concurrent boiler supplied by the Taganrog "Krasnyy kotel'shchik" [Red Boilermaker] association, a generator from the Leningrad "Elektrosila" association and a turbine from the Khar'kov electrical machine builders has already been completed. The machinery was assembled from large units and the work was completed early. Start-up operations have gotten under way on the main equipment and the whole system is undergoing comprehensive testing. Heavy pumps and other auxiliary equipment are going in and the water treatment shop's filters are being loaded with charcoal and the other necessary components. During these busy days the builders of the GRES, which the whole country is helping to erect, have received solid reinforcement. A large group of installers has arrived in Minchegaur from Riga, Leningrad and Kuybyshev, and has dug in right off the bat. The construction project's staff, headed by the Minchegaur gorkom, has in these pre-start-up days become the soul of the project. Competition totals are put out every 10 days and the results are right away publicity. A scarlet pennant is run up over the site in honor of the victors and photos of them are put on display. The builders are exerting every effort to keep their word and put into operation 3 months ahead of schedule the first unit of the Azerbaijan GRES, which is to become the most powerful thermal electric power station in the Transcaucasus. [Text] [Baku VYSHKA in Russian 11 Sep 81 p 1] 5454

EAST SIBERIAN GRES--Ulan Ude--Construction of the second section of the largest GRES in East Siberia has begun at the Buryat steppe settlement of Gusinoye Ozero. Next to the existing station building a second one has started going up and it will house electrical machinery with a total capacity of 1.26 million kilowatts. The builders have made ready to concrete the foundation of the coal unloading facility and pump station and have done reconstruction work on the ash traps. The second section will be equipped with improved boilers. Another smoke stack is going up 60 meters higher than the existing one. It will reach the 250-meter mark. The total capacity of the station, running on local coal, will amount to 2.1 million kilowatts. The electric power from the Gusinoozerskaya GRES will lend strong impetus to the development of all sectors of the national economy in the Buryat republic. The supply of electric power to sister republic Mongolia via the "Druzhba" trans-

mission line will increase. Building materials will be produced from the station's clinker. The abundance of hot water will enable the development of large hothouse facilities. [By A. Kleva] [Text] [Moscow IZVESTIYA in Russian 21 Aug 81 p 3] 5454

MARIYSKAYA GRES--Turkmenistan--The sixth power unit has gone on line at the republic's largest electric power station, the Mariyskaya GRES. The operators obligated themselves to get it up to the rated level early, by 7 November. The station's capacity will then reach 1.26 million kilowatts. Under the decisions of the 26th CPSU Congress, electric power production in the republic during the 11th Five-Year Plan is to be increased by a factor of 1.8. [Text] [Moscow IZVESTIYA in Russian 13 Sep 81 p 1] 5454

LITHUANIAN AES TURBOGENERATOR--Testing of an 800,000-kilowatt turbogenerator has been completed at the Leningrad "Elektrosila" association. The machine is destined for the Ignalinskaya AES in Lithuania, where the nation's first large multichannel 1.5-million-kilowatt reactor is being built. [Text] [Moscow PRAVDA in Russian 29 Aug 81 p 2] 5454

ARCTIC GES--Svetlogorsk (Krasnoyarskiy Kray)--Cutting out of the left bank part of the dam for the Kureyskaya GES has been started. It's necessary here to handle a half million cubic meters of rocky soil, to punch through a large tunnel. This hydro station above the Arctic Circle will place at the service of the national economy the energy of the Yenisey's right tributary, the Kureyka River. In Svetlogorsk, the station builders' settlement, living quarters, kindergartens, stores and a school have already been erected. [By V. Prokushev, PRAVDA correspondent] [Text] [Moscow PRAVDA in Russian 6 Sep 81 p 1] 5454

KOLA PENINSULA STATIONS--Rebuilding of the turbines and transformers of Nivskaya GES-II--firstling of Arctic hydro power engineering--has started. This is the initial operation in an extensive program to renovate power stations built on small rivers of the Kola Peninsula. This will result in a considerable enhancement of the region's energy potential without major supplemental capital investments, and its hydro resources will be more fully utilized. The first modernized machinery for Nivskaya GES-II is to be delivered this year. The turbulent mountain streams of the Kola Peninsula have long attracted the attention of power engineers. The taming of them began during the early five-year plans when a GES was built on the Niva River. During the less than half a century since passed, 15 hydro stations have been built in Murmanskaya Oblast. Two more--on the tundra stream, Teriberka--will go into operation during this five-year plan. [Text] [Moscow IZVESTIYA in Russian 22 Sep 81 p 3] 5454

EKIBASTUZ-CENTER TRANSMISSION LINE--Pavlodar--Pushing across a salt marsh, the builders of the Ekibastuz-Center 1500-kilovolt dc transmission line completed the first 100-kilometer section of the mammoth power bridge. It will carry electricity from a constellation of GRES's in Kazakhstan into the European part of the nation. At the suggestion of the "Tselinelektroset'stroy" trust innovators, assembly operations were concentrated at one industrial site. The electric trunk line, stretching nearly 2500 kilometers, will enable the conveyance of 42 billion kilowatt hours annually with minimum network losses. [Text] [Moscow IZVESTIYA in Russian 25 Sep 81 p 2] 5454

ABOVE-PAR PERFORMANCE--The 5th billion kilowatt-hours of electric power since the start of operation has been produced at Ekibastuzskaya GRES-1. The power workers achieved this mark after 15 months' operation. They engaged in active competition for the early achievement of capacities and are doing much to upgrade the qualifications of maintenance personnel. This has made their success possible. A year may be the norm for getting a power unit up to design capacity, but they take 3-4 months here. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 36, Sep 1981 p 9] 5454

BELOW-PAR SUPPLY SITUATION--The Ekibastuz electric power builders are getting ready to start the fourth GRES-1 power unit. In comparison with the first unit, boiler and turbine assembly on the fourth one took about half the time. Success was facilitated by strengthening ties with plants supplying the equipment. Agreements on socialist competition under the "worker relay race" principle were concluded with collectives of the "Leningrad Metal Plant" association, the Podol'sk Machine Building Plant, Barnaul Boiler Plant, Syzran Turbine Plant and many others. Except for the Belgorod Power Machinery Plant all are maintaining delivery schedules. But the Belgorod people delivered in the second quarter only 30% of the piping planned for. Equipment installation is now in process at the station's fifth and sixth units. Against this background, breaches of commitments by enterprises furnishing structures and materials are acutely noticeable. For instance, the Yermakovskiy Reinforced Concrete Structures Plant, in the course of half a year, failed to ship to Ekibastuz more than 10,000 cubic meters of precast reinforced concrete. And 500 cubic meters of what was received was defective. The Alma-Ata Reinforced Concrete Products Plant undersupplied on precast reinforced concrete by about 2000 cubic meters and the Tom'-Usinskiy plant by about 1700 cubic meters. Because of these three enterprises the builders are unable at this point to finish installing the framework of the No 2 fuel handler or get the shore pump station into service. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 36, Sep 81 p 9] 5454

TRANSMISSION LINE CONSTRUCTION AID--Lithuania--Linemen and installers on power transmission lines have obtained a reliable helper. An original device, the "stolbolaz" [pole climber], makes it possible to get up on reinforced concrete transmission line supports in just minutes. The author of the unusual pole climber-bicycle is Vitautis Gul'binas, candidate of technical sciences and docent in the Kaunas Polytechnical Institute mechanics faculty. His "creation" has been tested successfully at "Litenergo" enterprises and the GDR has acquired a license to manufacture the apparatus. [Text] [Naberezhnyy Chelny ZNAMYA KOMMUNIZMA in Russian 18 Jun 81 p 1] 5454

SMOLENSKAYA AES--The peaceful flow of the Desna through the rolling Smolenshchina plain and the turbulent rhythm of a huge construction project--such is the contrast which strikes one who is in Desnogorsk for the first time. This city is not yet on any map. The generators of the Smolenskaya AES haven't yet produced one kilowatt and the wires of the new transmission lines aren't yet crackling with a blue glow in the darkness. But the high tension increases daily and is sensed in every move of the builder and the installer, in the keen thinking of the nuclear physicist, and in the fine line of the designer bent over the drawing board. Start-up of the first power unit of the Smolenskaya AES--capacity, one million kilowatts--is getting close. Our paper's editors have assumed patronage of this project. TRUD's on-site working correspondent's post is reporting from Desnogorsk on the course of the operations. By appeal of the leading builders, installers and power workers, competition under the "worker relay race" principle is winding up. Included in it are all new collectives involved in the construction and outfitting of this giant of Soviet nuclear power engineering. [Text] [Moscow TRUD in Russian 10 Sep 81 p 1] 5454

CSO: 1822/8

ENERGY CONSERVATION

PROBLEMS IN DOMESTIC HEAT, HOT WATER SUPPLY OUTLINED

Moscow IZVESTIYA in Russian 24 Jul 81 p 2

[Article by N. Gromov, candidate of technical sciences: "How to Conserve Heat"]

[Text] The decree of the CPSU Central Committee and the USSR Council of Ministers "On Strengthening Work for Conservation and Efficient Use of Raw Material, Fuel and Energy, and other Material Resources" gives great importance to questions of conserving fuel and heat in the residential-communal service.

The TETs and boiler houses consumed over 120 million T of conventional fuel in 1980 to heat residential and public buildings in the cities and settlements. According to an estimate of the specialists, no less than a quarter of the heat obtained from the fuel was spent without benefit, mainly in the heating and hot water supply systems of the buildings.

It is customarily considered that overconsumption of fuel only takes place at plus temperatures outside. In fact, in warm weather the air temperature in the majority of apartments reaches very high values. This is impermissible even for sanitary conditions. Heat is overconsumed during the entire heating season however.

A famous paradox has been created: the inhabitants sometimes complain of the shortage of heating, while heat is consumed above the standard. Why does this happen?

Let us look at the complaints first. Some of them have been caused by a lack of knowledge of the standards. We have occasion to hear that the temperature in the apartments must be maintained at a level of 21-23° C. It is quite possible that the air temperature must be maintained in these limits in the rooms. But the heating system in the building is collective and is designed for air temperature of 18° in any of the apartments. Of course, the methods of computing the heating systems and installing them are not so advanced that the same temperature is guaranteed. The normal air temperature in the apartments and service rooms with sufficient heating should therefore be considered 18-20°.

The consumption of heat for hot water supply in the new residential buildings is almost equal to the consumption for heating. Whereas abroad the daily consumption of hot water per resident is 60-80 liters, ours is 100-120. The operating personnel share the blame for this excess. A lot of cooled water often has to be run before water of the necessary temperature is obtained. The loss of both heat and drinking water is useless here.

The heating networks from the TETs and communal boiler houses grow with each year. The development of these systems fosters fuel conservation, decrease in labor outlay outlays for maintenance, improvement in the air, and increase in the prestige of the work of the communal power engineers. The operation of these systems at the same time requires a completely different level of organization.

Whereas it is sufficient to maintain only a definite pressure in the water supply system, it is necessary to have a definite difference in pressures in the thermal two-pipe system between the feed and return pipelines. If this difference is insufficient, the air temperature in the house drops. There are frequent cases where only one-two apartments in the entire building are underheated. Rightful complaints of the residents develop in both cases.

The personnel of the heating system are guilty in the first case. They must accurately distribute all the hot water that the boiler house produces to the heating centers of the consumers. This task is often fulfilled with great errors because of the lack of water flow gages in the buildings. The mechanics of the ZhEK [housing operation office] and the enterprises often aggravate the situation by arbitrarily increasing the heat supply to the units they maintain.

The second case of complaints associated with underheating of one-two apartments while the others are generally overheated is also widespread. There are many reasons for this. Regulation of the heating systems is complicated by the fact that the heaters in many apartments have been arbitrarily enlarged. The heating center of the house should have control and measuring instruments, and water and heat counters, but they do not. The majority of heating centers in the buildings are located (and continue to be built) in cellars and basements which are inconvenient for maintenance. Experienced specialists who have engineering knowledge are needed to reveal the causes of underheating, but the residential apartments generally do not have them. It is very difficult under these conditions to establish the guilty party. The conflict most often ends by increasing the temperature in the complainant's apartment by increasing the hot water supply into the heating system. This results in overheating of the other apartments in the building.

How can normal air temperature be guaranteed in the apartments with the minimum consumption of heat?

The following way is possible, for example: strict separation of responsibility. The heating network is responsible for supplying hot water to the heating center of the house in a necessary quantity according to contract, and with the necessary temperature. The housing organization is responsible for distributing the water to the units and apartments. Heat meters are needed in the heating centers for this purpose.

Another way is to combine operation of the heating networks and the heating systems into the same hands, the thermal power engineering enterprises of the local soviets. There are many opponents of this solution. They say, and this is true, that the enterprises have enough serious tasks. They are responsible for the communal boiler houses, eliminating small unprofitable boiler houses, and a lot of major repair. They do all of this with very meager supply of material resources. But there are also many proponents. They stubbornly stand on their principles, considering quite correctly that it is impossible to solve the problem of ensuring

normal heat supply to each apartment with the minimum fuel consumption in any other way. The power engineer needs to become a concerned master of the generated heat who is completely responsible for its use.

The possibility of fuel conservation will increase significantly if there is organization of the operation of the complex which consists of the boiler house (or several small ones), heating networks and heating supply systems on the principle of a brigade contract. The brigade, headed by an experienced specialist, will conclude a contract with the enterprise for heat supply of the necessary number of apartments. The contract will indicate all the necessary (economic and labor) indicators and guarantee supply of fuel, water and electricity.

The usual apprehension that rewarding fuel conservation will result in a deterioration of heat supply to the buildings seems unlikely to us since the brigade will be interested in eliminating substantiated complaints. We stress, substantiated complaints, because all the conditions of heat supply, air temperature in the apartments (with normal heating), water temperature for daily needs and the schedule for its supply must be established in the contract between the housing office and the thermal power engineering enterprise.

It is very important that the brigade begin its activity with preparation for winter. This is the main guarantee of success. It is important to guarantee economical burning of fuel, to restore the furnace linings, eliminate all leaks in the outer networks and put the rooms of the heating centers into order in the houses, check all the heaters and inspect the fittings in the heating center and risers of the heating and hot water supply systems. In the final analysis, this will guarantee success.

The decisions of the 26th CPSU Congress indicate: "Take measures for further spread and increase in efficiency of the brigade form of organization and payment of labor. Develop a movement to expand the zones of maintenance, and mastery of related occupations." The proposed form of maintenance will also be a response to the decision of the congress. The chief aspect of it will be responsibility for the final result and material interest in fuel conservation, and finally, what is most important, the possibility of implementing this today.

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CSO: 1822/11

ENERGY CONSERVATION

PRODUCTION OF ENERGY-CONSUMING APPLIANCES DEPLORED

Moscow IZVESTIYA in Russian 20 Sep 81 p 3

[Article by V. Romanyuk, economic observer of IZVESTIYA: "Energy Guzzlers: Why Are These Household Machines and Appliances Still Manufactured"]

[Text] The following remark was heard at the interrepublic fair for wholesale household goods during the meeting of the fair committee: "Everyone commends thin-walled refrigerators because the capacity is increased. We make much of automatic multiprogram washing machines. But we do not note that in the first case we have "losses of cold," and this means overconsumption of electricity to restore it, while in the second case, we are creating the problem of installing these machines in apartments and increasing the energy consumption many times. The entire world attributes enormous importance to these factors, while our designers sometimes do not even consider them."

Is this so? The head of "Soyuzelektrobytmash" Ye. Vazhnov was not inclined to discuss this problem. He noted that development of less energy-intensive machines is underway, but it is still to early to judge the results. It is true that today we can speak of creating large-capacity refrigerators using a highly efficient method of producing cold. This innovation maintains a temperature of -18° in the freezer section, and what is no less important, requires 1.5-fold less electricity to produce the cold.

But the"modesty"of the head of the all-union association was understandable since he actually did not have anything special to talk about. The same refrigerators that have one advantage, also lose much more because of the low quality of the insulating materials. Only one out of ten refrigerators is equipped with polyurethane foam insulation. The others are insulated with less effective fiberglass and foam polystyrene. The enterprises of the Ministry of Machine Building for Light and Food Industry and Household Appliances require 40,000 T of polyurethane foam for the annual plan but are only allocated 3,000 T. Moreover, the Ministry of Chemical and Petroleum Machine Building has prolonged developing machines to fabricate and pour the new insulation material into the unit. Many foreign firms at the same time are concentrating special attention on strengthening thermal insulation. These are precisely the distinguishing features of the Finnish refrigerator "Rozenlev" which is being sold in our country. It has a large capacity and at the same time consumes less electricity than our domestic refrigerators.

A drastic increase in power consumption is occurring today in practically all household machines and appliances. This is associated to a certain degree with the "computerization" of household appliances and the attempt to liberate the working women from spending too much time doing housework, washing, ironing and cleaning the apartment. It has been computed that 20% of the time spent for housework is used to wash clothes. This is the annual balance of working time of roughly 9 million workers. The production of automatic and semi-automatic washing machines should rise 1.6-fold in this five-year plan. But the national economy is not indifferent to the path of production development, energy-consuming or energy-saving.

The widely advertised machine "Vyatka-avtomat," the brainchild of the Ministry of Machine Building of Light and Food Industry and Household Appliances is still not familiar to the general public. Fifty thousand machines should enter the market this year. This is a 12-program unit that is designed to simultaneously wash 4 kilograms of dry clothes with preheating of the soap solution. It is very energy-consuming. Its consumed power is 2.2 kilowatts, while the unit power of machines without preheating of the solution is 500-650 W. Installation of the "Vyatka-avtomat" machine also requires amplified electrical wiring which only 7% of the housing fund in our country is equipped with. The majority of residential buildings lack a ground wire, without which this machine cannot operate.

An interesting version of the machine has been suggested by the specialists of the Moscow projector plant. It excludes the soap solution heating block, the tubular electric heater and directly uses the hot water supply network. The washing machines "Evrika-3" and "Evrika-avtomat" which are manufacted at the plant are very popular with the housewives. The new version of automatic machine that was thought up by the plant enthusiasts would significantly reduce the energy capacity of the unit after eliminating all problems of installing the machine in an apartment with standard electrical wiring. But everything has come to a standstill because of the irreconcilable position of the Ministry of Machine Building of Light and Food Industry and Household Appliances, the chief ministry for washing machines. The "foreign" model (the projector plant is under the management of the Ministry of Electrical Engineering Industry) has also been slowed down in the branch institute VNIEKIEMP [All-Union Scientific and Experimental-Design Institute of Electrical Machine Production].

IZVESTIYA wrote a year ago about the misadventures of this promising development in the article "The Griefs of 'Evrika'" (No 187, 1980). The corresponding responses were received from the ministries and departments from which it seemed that the ice would move. The director of the Moscow projector plant, today a Hero of Socialist Labor, M. Garin reported that a long-term program of joint work to further improve the machines manufactured by the plant and to create new models, including those without a water preheater was finally worked out with the leading institute.

A year has passed, but the work has advanced little. The deputy chief designer of the plant M. Solov'yev speaks bitterly about the fact that manufacture of these machines may not be set up before 1984. As for the position of the Ministry of Machine Building of Light and Food Industry and Household Appliances, it has practically not changed. Its response contains the same arguments against the machine without preheater: "It does not guarantee complete washing out of dirt." The fact is that in order to obtain the required standard of washing quality for cottons and linens, the temperature of the soap solution in the automatic washing machines

must be 80-90°, while in the hot water supply systems it is usually only 60-75°. Experimental washing established that there was 38% washing out of dirt of cottons when hot water was poured in from the system at a temperature of 75°. This is 7% below the GOST requirements.

But the losses of these percents, which, judging from the editorial mail, the housewives will gladly put up with, are compensated for by numerous indisputable advantages. First of all, the women's hands will be completely free of washing, and secondly, the outlays of electricity are more than triply reduced.

The deputy chairman of Gosgrazhdanstroy Yu. Rodin also believes that it is necessary to organize production of automatic washing machines without preheating of the solution for use in the housing fund which does not have electrical circuits for connecting household machines and appliances with increased unit power. The fact that the enterprises of the Ministry of the Chemical Industry are already manufacturing powdered detergents ("Oka," "Robot" and others) which are designed to wash fabrics, including cottons and linens without any boiling also speaks in favor of this.

Of course, it is impossible to be reconciled to the fact that some of the residential buildings under construction are not equipped with the necessary electrical wiring in the apartments to provide for connection of a broad assortment of electrical household machines and appliances, including machines with increased power. The But fact is fact, this is often not done. The director of the institute TsNIIEP zhilishcha [Central Scientific Research and Planning Institute of Standard and Experimental Planning of Housing] B. Rubanenko makes a real estimate of the situation. Giving a high assessment to the development of the Moscow projector plant, he also suggests that we think about developing a small-sized automatic washing machine with capacity of 2 kg of clothes with preheating of the soap solution whose adjustable power would not exceed 1.3 kW.

Many readers who sent letters to the editorial office are convinced of the expediency of producing economical washing machines. They include Z. Popova from Yefremov in the Tul'skaya Oblast, Muscovite B. Klimov, F. Sidorov from Alma-Ata, and I. Kalenda from Vilnius. Here is the official opinion of the USSR Ministry of Trade: it is necessary to significantly raise the technical level of the manufactured washing machines as applied to the existing electrical circuits. The Ministry of Machine Building of Light and Food Industry and Household Appliances as the chief ministry is slow to solve the problems of changing the assortment structure of washing machine production.

It is asked, who is out of step? Lances are still being broken around questions which are as clear as day. Units with manual wringers comprise over 70% of the total output of washing machines, semi-automatic machines comprise 24%, and small-sized machines comprise 2.2%. The last wholesale fair showed that the unsatisfied demand for semi-automatic machines in 1982 will be 940,000, and 195,000 for small-sized machines. It is precisely these units which are the most economical in consumption of electricity and are the most convenient.

In speaking of the new developments of different household machines, innovations which have already been produced in series models, it is impossible not to note the sometimes scornful attitude to such indicators as energy consumption, simplicity

of operation and conservation of metal and materials. For example, the Podol'sk Mechanical Plant imeni Kalinin has developed household sewing machines of the "zig-zag" type which are simple and have many operations. They are useful items in daily life. Tests of sample machines with built-in electric motor, rotary shuttle and programmed control of the material feed will begin this year here. They make 15 types of stitches. The household lockstitching machine "Overlok" will also be tested. Knitting machines are being created with automated interlaying of the yarn, microwave ovens for the kitchen, and ironing and drying household units.

It goes without saying that it is not very difficult for our industry to set up the production of electronic components for household machines. But creative thinking should also be directed at improving such parameters as economicalness, reduction in energy-consumption of the appliances, and concentration of efforts precisely on developments that are the optimal in their consumption parameters and are fairly comfortable. If, say, an electric steam and spray iron is made, do we still have to spend efforts on making an ironing unit? By the way, according to the results of the latest wholesale fair, the market will have a shortage of 440,000 sewing machines, 520,000 electric vacuum cleaners, and the demand will not be satisfied for electric irons, manual knitting machines, mixers, lamps, electric ovens and a whole series of other items in 1982. These are the real everyday problems: where to buy good appliances that have long been mastered by industry? Thus, should we so actively make new appliances of increased energy-consumption and, by the way, very expensive ones, to the detriment of the less energy-consuming appliances which are in great demand by the population?

One cannot help but be alarmed at the situation that as production of energy-consuming machines increases, regulating devices are almost not produced or are produced in an insufficient quantity which guarantee the optimal operating mode for each process, or different types of thermoregulators. For example, we have different types of electric vacuum cleaners of improved comfort, and soon units will be put out with liquid filtering system which are capable of collecting almost 100% of the dust. But they are used to clean rugs, floors, curtains and book-shelves in practically one regime. In addition to an excess consumption of electricity, the quality of the operations is reduced. Operating at full power, the unit sucks up fabric with the dust, and tears the rugs and furniture upholstery. Or take the fans of the Yaroslav Electrical Machine Construction Plant. They are distinguished by high power, but we ask whether it is always necessary to drive the air such distances, create drafts and at the same time waste energy.

Another reader would say that this is a trifle. No, it is not a trifle! Just estimate how many vacuum cleaners are turned on at the same time in the mornings and how many fans turn during the hot weather. Even now there are 83 refrigerators, 72 washing machines and 63 sewing machines, and 97 electric irons for every 100 Soviet families. These figures are rising steadily. The energy outlays for domestic needs are increasing. Last year they were 2.7 billion kW-h of electricity for Moscow alone, exceeding the 1975 level by more than one-third. For the country as a whole, households currently consume over 80 billion kW-h of electricity a year. This is the power of over four power plants equal in power to the Bratsk GES taken together!

According to the data of the institute "Informelektro," universal use of electric regulating devices on household machines would reduce consumption of electricity for daily needs by 20%. What is interfering with the set-up of mass production

of these very simple items? The situation is being delayed to a great degree by the existing practice of planning the production of consumer goods. The full complement of items is not included in the plan in their mass. Calculation is done by the finished items. In the existing situation, "Soyuzapparat" of the Ministry of Electrical Engineering Industry and Power Machine Building, for example, which manufactures the regulating devices (they are not included in the plan for production of consumer goods) is at a disadvantage compared to "Soyuzagregat" of the same ministry which makes finished household machines. A clear case of absurdity!

It is impossible not to notice that many parameters of household machines which are placed in the current GOST requirements, including for energy consumption, allow the developers, designers and production engineers to live very freely. To all appearances, everything that is clearly wasteful must be decisively removed beyond the limits of the standards. It is no accident that the decree of the CPSU Central Committee and the USSR Council of Ministers "On Strengthening Work for Conservation and Efficient Use of Raw Material, Fuel and Energy, and other Material Resources" plans to guarantee a further improvement in the standards and specifications, and to strengthen their role in improving the quality of products and the economical use of resources. The GOSTs must thus include, among the main characteristics, indicators of metal consumption and energy consumption of the product which meet the best achievements of domestic and foreign science and technology. Certification for the highest category of quality will now only be given when these conditions are fulfilled. The norms, standards and regulations for designing and rating must correspondingly be reviewed, including for permissible voltages, margin of safety, testing methods, etc. It should be assumed that in light of all of these requirements the new development of the Moscow projector plant will no longer be a "pariah" of the main sector for household washing machines. I would like to believe this.

The domestic household machines are inferior in a number of indicators, including energy-consumption, to certain foreign analogs. The reason should be sought not only in the omissions of the machine builders. The motors, rubber items, hoses and wires, paint and varnish coatings supplied by the subcontractors leave much to be desired. Without a general improvement in the qualitative characteristics of all assemblies and parts without exception, without a clear and unified policy in this area which the leading ministries are obliged to conduct, the needed appliances will not be made which would be reliable, economical and simple to run.

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CSO: 1822/11

ENERGY CONSERVATION

CATALYTIC HEAT GENERATORS USED IN MANY AREAS

Moscow IZVESTIYA in Russian 16 Sep 81 p 3

[Interview with Academician G. K. Voreskov, director of the Institute of Catalysis, by A. Illarionov, in-house correspondent of IZVESTIYA; "Economical Heat Generators" — date and place not specified]

[Text] One ton of catalyst developed by the Siberian scientists saves 2000 T of fuel.

Ninety percent of the substance transformations are made today in the chemical and oil refining industry with the help of catalysts, substances which provide the necessary direction for the reactions and accelerate them. The most popular chemical process, fuel combustion, however, has been done without the help of catalysts until now. A lot is lost in this case. In order to make the combustion process optimal and economical, the Institute of Catalysis of the Siberian Department of the USSR Academy of Sciences designed the first catalytic heat generators (abbreviated as CHG).

The in-house IZVESTIYA correspondent met with the director of the institute, Academician G. K. Boreskov and asked him several questions on this subject.

[Question] Georgiy Konstantinovich, what are the main advantages of the catalytic heat generators as compared to the standard furnaces?

[Answer] Roughly three-fourths of all the fuel is consumed for technological purposes in different branches of industry. Not very high temperatures are generally required in this case. Therefore, when fuel is burned in standard flame furnaces, the hot furnace gases have to be rarefied with air. As a result, the coefficient of heat use is very low in the traditional furnaces. It averages less than 50%. The remaining heat escapes into the atmosphere.

In catalytic heat generators, the coefficient of heat utility is increased to 90-95%.

[Question] How is such a high efficiency of heat use achieved?

[Answer] We had to develop a special design of heat generator. Fuel is burned in this generator in a pseudoliquefied layer. It consists of solid particles and air blown through them and is similar to a boiling liquid. This layer also contains particles of catalyst which promote complete use of the oxygen contained in the air when there is a limited supply of it.

The coefficient of heat output is very high in the pseudoliquefied layer. The combustion process therefore becomes extremely intensive. The overall dimensions and metal-consumption of the generator are successfully reduced 5-10-fold as compared to the traditional industrial equipment. This is one of the significant advantages of the CHG as compared to the modern boiler units of the thermal power plants. Another advantage of which we have already spoken is the high coefficient of heat use.

[Question] Can it be said that the development of catalytic heat generators opens up a new trend in power engineering?

[Answer] Catalysts have been occasionally used on small scales previously to burn fuels, but this process took place in small and imperfect equipment which could not be viewed as technological, industrial units. It was impossible at that time to develop this advanced technological process. The research in the field of catalysis and pseudoliquefied layer were insufficient.

Now we have these opportunities and we are trying to make use of them. I think that the catalytic heat generator can be considered a new trend in power engineering.

[Question] Can the CHG be used to burn low-grade types of fuel?

[Answer] Catalytic heat generators drastically reduce the requirements for the quality of fuel. We are working in the laboratories on combustion of what the miners do not call coal, but rock. It is interesting that in this case the efficiency of the generator is diminished very slightly.

The CHG can be used not only to produce heat, but also to produce different types of products. Rather a lot of opportunities are afforded by the use of these generators. The heat of the burned fuel can be used for various types of thermal treatment. We used the CHG to obtain active oxides of aluminum, a very important component of catalysts. We plan to use this type of generator to separate sulfur from hydrogen sulfide.

Until now, industry has not had advanced methods of drying the hard coal. There is a great need for this. The catalytic heat generator dries the coal with hot gases that essentially do not contain oxygen. This is a guarantee against oxidation and ignition of the coal. This type of generator is being installed in Kuzbass. It has fairly high output.

Drying of grain, both seed and food grain, is yet another important area of CHG application. The traditional dryers reduce the percentage of the grain germinating capacity by overheating it. The catalytic heat generator makes it possible to limit the heating temperature to the necessary level. Food grain is successfully protected from contamination by combustion products in the new type of driers.

We are making these very promising developments with the collectives of the Siberian Department of VASKhNIL [All-Union Academy of Agricultural Sciences imeni V. I. Lenin]. By the way, next year we will start up a unit to heat greenhouses in the experimental production farm "Elitnoye" of the Siberian Department of VASKhNIL.

Catalytic heat generators are of great importance for the oil refining industry and the efficient evaporation of different oil fractions. Yet another, perhaps unexpected application of them is neutralization of waste water.

Here is a specific example. In Severodonetsk, in the production association "Azot," the waste waters contain harmful organic admixtures. They are currently neutralized by a very uneconomical method. A little waste water is added to a natural gas flame at a temperature about a thousand degrees. The use of a catalyst will make it possible to burn these harmful admixtures without gas, and also use the heat from their combustion.

[Question] They say that the use of the CHG in itself reduces the quantity of harmful emissions into the atmosphere?

[Answer] Absolutely. First of all, fuel combustion in these generators eliminates the formation of nitric oxides. These oxides are formed in standard furnaces because of the high temperature. The temperature is successfully lowered in the CHG. Secondly, the catalytic heat generators help to avoid harmful products of incomplete fuel combustion such as carbon monoxide.

[Question] Georgiy Konstantinovich, can it be said that the use of the CHG was prompted by the most urgent needs of the national economy?

[Answer] Yes, and mainly by the need for fuel conservation. It is impermissible today to operate with a 50% coefficient of fuel use when the cost of heat is so high. It is also important to save metal, as already indicated.

It is impossible not to notice that the catalytic heat generator requires a fan of increased power as compared to the flame furnace. Its fabrication and operation are compensated for many times.

[Question] The specialists ask: is manufacture of the catalysts for the CHG expensive?

[Answer] These are inexpensive catalysts. Combustion of 4,000 T of fuel requires 1 T of catalyst. It saves 2,000 T of fuel. Manufacture of 1 T of catalyst requires only 4 T of fuel.

Organization of industrial production of catlysts is nevertheless a problem today. The generator itself is so simple in design that it is manufactured in any repair workshop. But industrial plants are needed to make the catalysts.

I would like to hope that the newspaper IZVESTIYA will help to overcome the difficulties in introducing the catalytic heat generators into the national economy.

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CSO: 1822/11

ENERGY CONSERVATION

VOLKHOV ALUMINUM PLANT CONSERVES FUEL

Moscow IZVESTIYA in Russian 24 Sep 81 p 1

[Article by Ya. Strugach, correspondent of the newspaper LENINGRADSKAYA PRAVDA: "If Heat Works Twice"]

[Text] The Volkhov aluminum plant annually conserves tens of thousands of tons of fuel.

The volume of production increases from year to year at the Volkhov aluminum plant. It would seem that more energy would be needed for this, the more so since that city itself which receives heat from the plant boilers is also growing. The The output of the boiler house is continually dropping however. Counting by years goes in the opposite direction and the plant specialists report with pride: "Our boiler house currently operates at the 1974 level."

Where do the additional energy resources come from? They come from those production units where ore is roasted, from the equipment which previously discharged incandescent gases into the sky, heating the atmosphere, and now allow this heat to be used, and from the interest of the people in conservation and their ability to do this.

"Out attitude towards energy resources is changing and the psychology of the workers, specialists and leaders is changing," says deputy chief engineer of the plant O. Ivanov.

The sulfuric acid shop of the plant has been made a unique test site where the engineering ideas which have been translated into metal are tested and introduced. Several years ago, when reconstruction was started here, it was decided to equip the sulfur combustion furnaces with boiler-recovery units. The temperature of the sulfurous gas exceeds a thousand degrees, then it is cooled, heating the water in this case.

After the shop was reconstructed, the Volkhov aluminum plant began to produce the country's least expensive sulfuric acid, and the plant service began to count up fuel economy which rose from year to year.

It was found that there is a great host of sources of secondary energy resources at the plant. Say that there are three rotary furnaces in the alumina shop. It is hot to stand between them on the platforms. The temperature of the exhaust

reaches 500 degrees. One day the plant engineers focused attention on the dust-trapping chambers that were once installed behind the furnaces, and turned out to be unnecessary for a number of reasons. What if heat and not dust were trapped here?

The calculations confirmed the fruitfulness of the idea. A total of R 35,000 was spent on the manufacture and installation of the first unit, called a heat-using unit. It completely compensated for itself in 4 months. The heat losses in the furnace were reduced by almost double.

Many production sections of the plant have now introduced many similar units and innovations. Together they have provided an increase in the output of secondary energy resources alone by 30% during the 10th Five-Year Plan, and by another 15% in the last 8 months as compared to last year.

The figures are impressive. Whereas last year the plant generated 278,000 gigacalories of secondary energy resources, this year, this index will rise to 325,000. The plant economists calculated that the specific outlays for conservation of a ton of comparison fuel are only about R 8. Compare: it is necessary to spend up to R 100 to extract this same ton of fuel.

Any initiative of the plant specialists which is aimed at increasing the output of secondary energy resources is supported by the leaders of the enterprise and the party committee.

Conserved energy resources and raw materials are invariably considered in the socialist competition of the brigades and shops. The personal accounts of conservation, and questions of the efficient use of all material valuables are constantly in the visual field of the party committee commission and the people's inspectors. Starting with this year, all of this work is being done in accordance with the integrated target program "Energy" which was developed for the 11th Five-Year Plan and to 1990.

The program provides for equipping the alumina shop in the near future with devices which will reduce the real fuel consumption by 20%, increase the output of of the furnace unit by 2-2.5-fold, and reduce the fuel consumption by a third. After the existing furnaces have been replaced, laying of alumina will become more advanced.

The deputies of the Volkhov gorsovet have recently been more actively included in the movement for conservation. After IZVESTIYA published the lead article "For Conservation and Economy" the city set up a headquarters for conservation of energy resources, and defined the tasks and directions of its activity. The main task of the headquarters is to involve all the Volkhov residents in conservation of energy resources and to teach each to have the kind of concern for them in daily life that the workers of theVolkhov aluminum plant have.

We are becoming acquainted with the plant. O. Ivanov is continually stopping:

"Pay attention, these pipes smoked to the utmost, and now the sky above the plant is clean. This is only one result of the conservation. We now easily fit into the standards set by the environmental protection service. The emissions will become even lower during the five-year plan.

Here is the shop where the first aluminum was produced. Do you know how much electricity was consumed then to melt a ton of metal? Then 23,000 kilowatt-hours were used, whereas now 16,600. We have finished technical solutions which will reduce the specific consumption of electricity by 20%."

I began to involuntarily look at the shops and facilities of the Volkhov aluminum plant from the viewpoint of the workers, engineers and leaders who have noticed more new opportunities for completely using the extracted energy and who have become thrifty, business-like masters in their house.

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CSO: 1822/11

MEASURES TAKEN TO IMPROVE AL'MET'YEVSK OIL OUTPUT

Kazan' SOVETSKAYA TATARIYA in Russian 18 Jul 81 p 2

[Article by A. Slivchenko, head of the Al'met'yevsk administration to improve oil output of the beds and for major repair of wells: "Long Life for the Wells"]

> [Text] The 26th CPSU Congress has planned extraction of up to 630-640 million tons of oil and gas condensate in the country by the end of the current five-year plan. The oil workers of Tatariya have many tasks to resolve in this respect.

It is common knowledge that the conditions for oil extraction in the republic are becoming more complicated. The well fund is becoming older. Fields with worse operating potentialities are being worked.

Fufillment of the geological engineering measures to improve oil output of the beds is primarily associated with the rapidly rising volume of repair-insulation and restoration work in the wells, and expansion of their nomenclature. This required a number of measures to build up the machinery of the major repair service and to improve their efficient running. Over 18,000 wells were restored during the 10th Five-Year Plan alone. This resulted in an additional extraction of over 7.7 million tons of "black gold" and pumping of over 71 million cubic meters of water into the productive beds.

The number of repairs during this time increased from 2885 to 4276 per year, and the volume of the most labor-intensive insulation work rose by 59%. Labor productivity of the major repair brigades improved slightly, only by 6%. Discrepancies developed between the demand for repair work and the capabilities of our services. We had to create an additional 150 shafts. Nevertheless, the demand was far from completely satisfied, the more so since it will significantly rise by the end of this five-year plan.

We are faced with pumping 285,000 tons of sulfuric acid, 50,000 tons of surface-active substances, 942 million cubic meters of air, 2 million tons of steam, and 3.6 million tons of carbon dioxide into the oil beds during the five-year plan. An additional extraction of 6.1 million tons of oil is planned through the fulfillment of these measures. A considerable percentage of this work will be done by the forces of our administration.

The association "Tatneft'" is executing a set of measures to strengthen the major repair services and to improve the efficient use of the available machinery. The repair services are being concentrated and specialized. This will improve labor organization in the brigades, conduct a unified technical policy, expand the production ties, and strengthen the tie between science and industry.

Setting-up of well repair sections in the ministry and association has permitted more successful resolution of our problems. A number of developments to improve labor organization, systems of planning and stimulation, and improvement in the level of mechanization and labor productivity have been introduced into production in recent years alone. This has been achieved because of the introduction of new units and the assimilation of more advanced technology.

Many types of equipment for the brigades of major well repair unfortunately spend a long time in the development stage and are manufactured in a small quantity. Labor productivity is therefore not always significantly raised. Development of special equipment for transporting and injecting chemical reagents into the oil beds is also slow.

There are advances, nevertheless. Higher quality and more reliable packing materials have been introduced in recent years. A number of new and promising technical solutions have been worked out. Gipan, and mixtures of oil and resin with sulfuric acid are being widely used in the wells as insulating and selective materials. Chemical deposit heaters, specialized column covers and packing devices are used.

So-called quick methods of repair are effectively employed. They allow individual technological operations to be done with a considerable reduction in time and resources using devices which are lowered into the well on a cable. The use of the cable technology alone has resulted in the additional extraction of over 100,000 tons of oil and has saved about R 4 million. A lot of attention is given to increasing the well operating period between repairs. This is achieved by optimizing the operating conditions of the intrawell equipment, improving the degree of reliability and quality of repair. Each oil and gas extracting administration has active groups who are responsible for determining the optimal operating conditions of the intrawell equipment. Optimization problems are solved with the use of computers.

It is planned to make broader use of the reserves of production and to perfect labor organization for the further development and strengthening of our services. This will mainly be done through internal specialization and increase in the shift work of the brigades, improvement in their technical equipment, mechanization of labor, as well as further improvement in the repair technology.

One association, "Tatneft'", however, is not capable of solving certain problems. It needs the assistance of the USSR Ministry of the Petroleum Industry. In particular, transfer of the major repair services to the main industries would foster their strengthening. Left as an auxiliary industry, they lag behind in their development and it is difficult to get highly skilled personnel for them.

The time has come to set up a branch scientific research and design organization for repair of oil wells and to develop the technology and equipment for the repairmen.

The increased amount of work to restore wells has resulted in the development in each oil region of their own procedures and technology of repair. This localized approach does not promote efficiency in work. Unification of the employed equipment and tools and working out of unified technological procedures are required so that all questions of major well repair have an integrated solution.

We would be greatly helped by accelerated construction of the plant of oil field and drilling equipment in Zainsk. Its start-up will provide for the needs not only of the oil enterprises of Tatariya, but also of the branch.

Like all the oil workers of our republic, the services of major well repair are making their contribution to extraction of the 2 billionth ton of oil. The Al'met'yevsk administration to improve oil output of the beds and for major repair of wells has successfully fulfilled the six-month plan. We have restored 536 oil and injection wells, including four above the plan. An additional 98,000 tons of oil will be extracted and 575,000 cubic meters of water will be injected into the beds this year because of the successful insulating of the wells. The removal of accompanying deposit water from the oil wells was reduced by roughly 308,000 cubic meters.

The brigade of the foreman, USSR State Prize laureate A. Abdullin is exemplary in the competition of repairmen. This collective plans to fulfill the annual plan by the day that the 2 billionth ton of oil is extracted.

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CSO: 1822/2

GOR'KIY-NOVKI PIPELINE APPROACHES COMPLETION

Moscow PRAVDA in Russian 3 Sep 81 p 1

[Article by R. Yevseyeva: "Towards the Last Kilometer"]

[Text] The builders from the Ministry of Construction of Petroleum and Gas Industry Enterprises have passed an important boundary on the Gor'kiy-Novki product pipeline route. They have completed welding a 200-kilometer trunk line from a total of 228 kilometers. Insulation and laying operations, trench-digging and backfilling are continuing.

The new underground trunk line which begins at the Gor'kiy oil refinery can carry hundreds of thousands of tons of gasoline, diesel fuel and other oil refining products great distances during the year. The route is comparatively short, but its economic efficiency is considerable. On the railroad section from Gor'kiy to Vladimir alone, hundreds of railroad cars per year will be successfully freed up to haul other national economic freight.

The Gor'kiy-Novki route has given the builders many surprises.

"I cannot say immediately where it is more difficult to work, in the north, in Siberia, or in this small corner of the central zone. In the north there are swamps and taiga, while here there is enough of all that, plus there is no kilometer where you do not run into a railroad, highway, cable, or small river," relates V. Grinchenko, brigade foreman of the insulating and laying column SMU-6 of the trust "Mosgazprovodstroy." By the way, he has been building underground trunk line for 20 years already, and he has worked in a lot of places.

In fact, on the 228-kilometer route, they ran into about 20 crossings through automobile roads and railroads, and 15 through water obstacles, including the rivers Oka, Kerzha and Klyaz'ma, as well as Lake Zapol'skoye.

The subdivisions of the trusts "Ryazan'truboprovdstroy" and "Mosgazprovodstroy" are trying to work in an integrated manner. They often make forced crossings of small rivers and overcome swampy sections by their own forces, without waiting for the divers. The brigades of V. Shvarts and V. Korolev are close to completing the welding operations. The insulating and laying columns are advancing confidently. Communications lines and electrical and chemical protection run next to the pipeline which has been laid.

At the same time work is underway at the Vladimir filling point from which gasoline and diesel fuel will be supplied to the customers of tractor and trailor rigs and tank trucks. The advance mechanized column of the trust "Mosgazprovodstroy, the Bulgarian specialists from the Bulgarian board of pipeline builders, and the representatives of the installation administrations are working here. Installation of the first of 17 tanks planned for here has already been started.

"Our work is complicated," relates the head of the section Stanislav Stepanovich Morozov, "by the fact that we are faced with building many, comparatively small, but necessary and important facilities. The oil trap and the biological treatment plant, fire station and ring of the fire water line, transformer substation and roads are being erected. We also have to lay several water lines."

The workers of the subdivisions of the Ministry of Construction of Petroleum and Gas Industry Enterprises who are building the product line are applying all their efforts so that the new underground trunk line is started up by the 64th anniversay of the Great October Revolution.

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CSO: 1822/2

KOMSOMOLS APPEAL FOR INTEGRATION IN URENGOY-PETROVSK PIPELINE CONSTRUCTION

Moscow KOMSOMOL'SKAYA PRAVDA in Russian 1 Sep 81 p 1

[Article by V. Khlystun, special correspondent: "Young Builders of the Urengoy-Petrovsk Gas Pipeline Prepare a Channel for the Blue River"]

[Text] The large scales of gas pipeline construction are spellbinding. What is the Urengoy-Petrovsk line, for example? The total length is 2,731 kilometers, through swamps, forests and ravines. But this is not all. There are 239 rivers and streams on the trunk line route that have to be crossed. In order to "traverse" the Ob', for example, the builders have to "stride" more than 13 kilometers. And think what 133 crossings over railroads and highways means! To end with the figures, I will name the last, most impressive figure: the cost of building the Urengoy-Petrovsk gas pipeline is R 2.2 billion. In addition there is housing, kindergartens, and schools, everything that the builder or gas extractor cannot do without.

I was told in Novyy Urengoy about the Komsomol youth collective of concrete workers where the brigade foreman was Leonid Vakhnovan, and the group Komsomol organizer was Vladimir Vapnichnyy. There are eleven fellows working in the trust "Urengoy-stroygazdobycha." They work well and uninterruptedly. It is this excellent quality, uninterruptedness, which is priceless here, which suddenly brought unexpected consequences for the young builders. The "rule" began to be in effect that whoever transports the materials, must also load them. They "transported" everything that they had to. If someone did not finish, they asked for help. If a breakdown occurred because of someone's fault, again they were rescued. The Komsomols work well, while those who worry about trifles have a miserly result. It is alright if interruptions are made to eliminate some kind of accident. There is no dispute here. But patching up others' lapses? In short, the fellows were indignant and said:

"We have had enough with completing work after others. Give us the house so that we can build it ourselves, from foundation to the end."

They fought for a long time, but finally were convincing and were given a facility. What happened? The Komsomols sprouted wings, and they literally constructed a two-story cottage in 2 months.

I give this example to stress the following thought. There are tens of thousands of people working to build the gas pipeline, numerous organizations and subdivisions which are often subordinate to different ministries and departments. The structure

of control changes, central boards are created and new trusts are set up. Only the actual lower links remain unchanged, the brigades, teams and columns. Their initiative and their fresh voice are worth their weight in gold.

It is now important to prepare for winter. This is why the Komsomols from the trust "Urengoytruboprovodstroy" pestered me so persistently.

"We have to try and convince our leaders through KOMSOMOL'SKAYA PRAVDA that integrated brigades are needed like air," Yuriy Tokhtamyshev, secretary of the Komsomol committee of the trust proved to me.

This is the situation. The trucks "Ural" and "KRAZ" deliver the lengths, three pipes almost 1.5 meters in diameter welded together, to the route over the winter road. The length-carriers, as they are called here, are separated into individual groups, while the drivers are united into brigades that operate according to a unified order. But the snag is that the powerful tractor-pipe-layers are managed by another subdivision of the same trust. The maintenance personnel are paid by the hour.

The trust Komsomols have appealed to the leadership many times. "Let us set up an integrated brigade which would include the machine operators of the pipe-layers. We will pay them according to a unified order."

"We were thoroughly involved in this matter," says Yuriy Tokhtamyshev. "We selected a new young brigade foreman Mikhail Girenko. We sent him to Moscow in May to special courses that were organized by the ministry. We finally negotiated with the fellows and everyone agreed, but the leadership would have nothing to do with it as before."

The silence of the trust leadership defies explanation. It is clear that this is their argument: once work is moving, and then rapidly, the plans are being fulfilled, why are there excess troubles about setting up an integrated brigade? But now we are talking about the uniquely short periods which have been set for building the gas pipeline. Surely we have to approach the work with a more modern measure. There are examples of this.

In the Komsomol'skiy settlement (the last segment of the Tyumen' part of the gas pipeline passes here), the chief engineer of construction administration No 6 of the trust "Kosmosol'sktruboprovodstroy" Shamil'Gubaydullovich Kal'met'yev told me about the most interesting initiative which they undertook. The idea developed of creating an integrated production-line administration on the route. The trust is already preparing for the experiment, and it is just about to begin. What is it essentially? The final result is important for the gas builders, as for everyone else. It is good and bad for all. It is now very difficult to determine what relationship this result has to the payment of the workers of a certain subdivision. One organization prepares the route, another digs the trenches, another welds the pipes, etc. None of them depends on the other. It has been suggested that a production line be formed which would bear complete responsibility for the started-up pipeline, from start to finish. The entire system is based on the order-free system.

The experiment has a specific goal: to reduce the number of people working on the route, to increase the per-worker wages, and to raise the rate of construction. This is most important today.

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CSO: 1822/2

KAZAN' COMPRESSOR PLANT PRODUCES EQUIPMENT FOR WEST SIBERIA

Moscow PRAVDA in Russian 12 Sep 81 p 1

[Article by R. Sabirov, correspondent of PRAVDA: "Addressed to the Oil Workers"]

[Text] The Kazan' compressor plant has shipped a unit to the oil workers of the Tyumen'skaya Oblast for West Siberia's first automated cluster compressor station. It is designed for gas lift extraction of liquid fuel.

"The essence of the gas lift method of oil extraction is that compressed natural gas under high pressure is pumped into the producing well," chief engineer of the enterprise P. Aleksandrovskiy relates. "After being partially dissolved in the oil, it forms at the well head a "light-weight" mixture which is raised to the surface without additional mechanical interference. This results in the most complete extraction of the liquid fuel from the depths."

In cooperation with the engineers of the Kazan' special design office for compressor construction, we succeeded in making a machine which meets all the requirements of the oil workers. The power of this unit, 6,000 kW, allows natural gas to be pumped into the earth at a pressure up to 110 atmospheres. The centrifugal machines of the Kazan' plant are much more productive than the gas compressors used up until now. The station that is equipped with these units is assembled on the spot twice as fast as the current ones.

The enterprise collective had a very responsible attitude in manufacturing the new compressors. The entire increase in output of plant products this year, 2 million rubles, had to be reached precisely through expanded output of these machines. Competition developed in the enterprise sections for early preparation of the necessary documents, while the shops competed for early shipment of the finished units to the West Siberian oil workers. The new machines will help them to reach their daily extraction of "black gold" of a million tons more quickly.

The brigades of the experienced mechanics led by V. Smyshlyayev and V. Denisov distinguished themselves in assembling the first high-pressure centrifugal compressor. They completed all the work way ahead of schedule.

The Kazan' plant in this five-year plan must produce machines for 17 cluster automated stations for the Tyumen'skaya Oblast oil workers. The line method is used to make the units. Now, for example, the brigades of A. Nichiporchik and V. Zimin

in the boiler-welding shop are making the housing of the third machine. The collectives headed by brigade foremen N. Shinkevich and M. Timofeyev are making the base parts for it in the mechanical shop. At the same time the 12-ton housings for the next, fourth unit are being drilled in the neighboring shop on special machines.

The collective of the Kazan' compressor plant will send another unit to West Siberia before the end of the year. The first automated station for gas lift extraction of oil will thus be complete. The output of the oil wells will be greatly increased with its start-up.

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SCIENCE, INDUSTRY COOPERATE IN AZERBAIJAN OIL PRODUCTION

Baku VYSHKA in Russian 20 Sep 81 p 2

[Article by N. Aliyev, minister of petroleum refining and petrochemical industry of the Azerbaijan SSR: "In Close Union with Science"]

[Text] When production of lubricating oils was started at the first Baku petroleum plants in the 1880's, D. I. Mendeleyev noted: "This was an important step of Russian petroleum business. The Baku oil yields many lubricating oils which are of excellent quality, so that they merited a lot of attention everywhere."

Then, at the dawn of establishment of the oil industry, Azerbaijan practically did not have its own national scientific and engineering teams in the field of oil and gas refining technology. Among the scientists and engineers who played a large role in organizing the study of oil and its chemical refining, as well as in the training of personnel, we name with gratitude D. Mendeleyev, N. Zelinskiy, S. Nametkin, V. Shukhov, L. Gurvich, M. Kapelyushkin, Yu. Mamedaliyev and others.

During the entire history of its development, the petroleum refining and petrochemical industry of Azerbaijan has been continually linked to the work of our country's and republic's scientists. They stressed in their works the thought that oil as the most valuable mineral has hidden and inexhaustible potential wealth not only to produce fuel and oils, but also to develop the petrochemical industry.

Our republic started extensive research in the 1930's and 1940's in the field of chemical refining of oil. In this case, we focused a lot of attention on the maximum use of the properties of the unique Baku oils. The last cube-ore batteries were eliminated in this period, new tubular units for primary oil refining, and a number of new oil production units were built. Introduction of secondary raw material refining was started. For this purpose, thermal cracking and pyrolysis plants were made.

During the Great Patriotic War, continuous production of high-quality fuels, oils and other products for the needs of the front was set up by the forces of the Azerbaijan scientists and oil refiners. The Baku oil workers and oil refiners are deservedly proud of the fact that they made a weighty contribution to defeating the Fascist hordes.

Some active enterprises were reconstructed in the Azerbaijan oil refining industry in the postwar period. This increased the output of light petroleum products and lubricating oils. One of the most important feats of this period which was done in

close cooperation with the scientists and production engineers was updating of the Baku thermal cracking units. This allowed transfer to refining of gas-solar oil fractions. For the first time in the country, we developed and introduced the processes of producing aviation kerosene from Baku oils and additives for oils. Start-up of the Novo-Baku Oil Refinery imeni Vladimir Il'ich with modern production processes was a great event. The process of catalytic cracking with fluidized bed of the catalyzer was introduced for the first time in the country.

The creation of a petrochemical branch of industry in the country became an important stage in the development of oil refining. A number of powerful petrochemical complexes were set up in Sumgait. They use hydrocarbon raw materials obtained at the Baku plants.

But the needs of scientific and technical progress demanded further increase in the oil refining outputs, and improvement in the quality of the products. The party and government therefore stipulated a radical reconstruction of the Baku oil refineries. The reconstruction provided for introduction into production of new, highly efficient production processes and industries which were developed by the country's and republic's scientists. They included processes of catalytic reforming of gasoline, catalytic cracking, hydropurification of oils and fuels, coking, and a number of others.

A powerful unit for atmospheric-vacuum distillation of oil and a complex for catalytic reforming of gasolines were constructed and put into operation in short periods in the Novo-Baku Oil Refinery imeni Vladimir Il'ich. This increased the production of high-octane nonethylated gasolines several times. This is very important for reducing atmospheric pollution by exhausts. A unit for hydropurification of oils has been put into operation in the Baku Oil Refinery imeni 22nd CPSU Congress. In addition to the improved quality of the motor oils, this unit eliminated consumption of sulfuric acid, alkali, lime and gumbrin and unrecoverable production wastes. In addition to a high economic effect, this also fostered an improvement in the environment. This same plant is currently completing construction and conducting start-up-adjustment work on the second powerful ELOU AVT [automatic electric desalination unit].

The decisions of the 26th CPSU Congress and the 30th Congress of the Azerbaijan Communist Party have set new and important tasks before the oil refiners. We must complete reconstruction of the plants during the current 11th Five-Year Plan. Even now the oil refining industry of Azerbaijan is a major fuel and oil complex that is equipped with modern equipment, including advanced processes of oil refining with sufficiently developed secondary processes.

The interest in oil as a raw material for petrochemical synthesis which has increased in recent years has attracted more extensive study of its composition and properties, as well as improvement and development of new processes of oil refining. This is unthinkable without a fundamental scientific base and deep economic analysis. Further development of oil refining and petrochemistry, as well as other branches of the national economy can only be attained in close contact between science and technology. It is difficult to overrate the importance of the scientific and technical societies in this respect, in particular, the All-Union Chemical Society imeni D. I. Mendeleyev.

The work of this society, like the Mendeleyev congresses, has reflected the different stages of development of chemistry and petrochemistry. The programs of past congresses were comprehensive. They included both traditional questions of general chemistry, chemical technology, organic synthesis, and the latest problems of chemical kinetics, radio chemistry, agrochemistry, and the comprehensive use of chemical raw material. Each Mendeleyev congress is a significant phenomenon in the life of the entire country and the chemical community of the world.

The 12th Mendeleyev Congress which will open on 21 September in the capital of our republic, Baku, will take place in the year of the 26th CPSU Congress. It has planned a grand program to advance our country towards communism. There is no doubt that the oil refiners, petrochemists and chemists will draw a lot of useful information from the congress, and its recommendations will help them to solve the tasks facing them more successfully.

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CSO: 1822/1

CONCENTRATION OF PLUGGING SECTION INCREASES AZNAKAYEVO OIL OUTPUT

Kazan' SOVETSKAYA TATARIYA in Russian 2 Jul 81 p 2

[Article by M. Zakiyev, head of the technological section of the Aznakayevo administration for increased oil bed output and major repair of wells, and Ya. Gilyazov, senior engineer of the technological section of the administration: Dictated by Life"]

> [Text] The workers and specialists of the Aznakayevo administration for increased oil bed output and major repair of wells have adopted high commitments for this year. The task is to restore no less than 1070 wells in the first year of the 11th Five-Year Plan, and at the same time, guarantee the smooth work of the oil field workers.

We are focusing special attention on improved efficiency of the insulation work and improved quality of major repair of the wells. Our work is complicated by the fact that introduction of intensive systems for operating the oil fields with increased pressure dictates the creation of a hydrodynamic situation in the wells. The use of traditional cement suspensions therefore becomes ineffectual in a number of cases.

The basic prerequisites for success are the search for and introduction of the most promising methods to increase oil bed output. The administration shops are employing various methods to increase well productivity. Sulfuric acid sludge, gipan-based polymer mixtures, TSD-9 resin, oil-base granulated magnesium slurry and foam systems are used to isolate the water.

It is not so easy to do all of this, of course. The use of the most effective methods requires additional theoretical and practical knowledge to carry out water-insulation work. Since we still do not have enough highly skilled specialists, the technological and economic effectiveness of these procedures are still far from the desired results.

There is also a complication in the fact that well repair makes use of different types of equipment and a large number of different reagents whose concentration varies for each case. This is why the problem of reducing water withdrawal in the oil fields is an urgent problem and requires a qualitatively new approach.

Taking into consideration the importance of this problem, the administration specialists developed a set of organizational-technical measures aimed at improving the efficiency of the insulation work. The scientific research laboratory of the enterprise, in particular, has set up a plugging section whose chief task is the specialization of all types of insulation work. The section has experienced specialists, including foremen P. Vachayev, B. Akhmetor and R. Garipov.

All of this has created the conditions for more skilled management of the developments and introduction of new production plans, as well as improved quality of the operations. All plugging operations are currently done on an operational system. Whereas the foreman or senior foreman of major well repair previously performed an average of one-three operations in a month. now the foreman of the plugging section does up to 40 in the same time. Quality control of the plugging materials has been significantly improved.

Based on the new labor organization, the administration collective has reduced the accident rate in plugging operations. Whereas before the section was set up, hermetic sealing of one rupture in the operational column required 3-3.5 sealings, it now takes two sealings on the average for the enterprise. Our collective executed 1209 operations in 1980. The success factor was 95% versus 84% in 1979. This is the best indicator in the "Tatneft'" association. This resulted in additional extraction of over 102,000 tons of oil.

Setting up of the plugging section in the administration will solve the problem of equipment use to a certain measure. Its traffic route is now set by the plugging section depending on the most efficient use, and not on the affiliation of the wells to a certain subdivision. Concentrating the equipment in one section improved labor organization and reduced lags in the brigades for major well repair.

The collective has successfully completed the 5-month assignment of the first year of the 11th Five-Year Plan for all the basic technical and economic indicators. Over 450 wells have been put into operation since the beginning of the year. This permitted extraction of about an additional 11,000 tons of liquid fuel, and at the same time, made a worthy contribution to extraction of the 2 billionth ton of oil.

We will continue to improve labor organization. We are planning to concentrate all the plugging materials at the chemical base. It has become necessary to set up a separate column in the administration of technological transport No 3 to service the plugging section and the dispatcher service, and to transfer the chemical base with the chemical-analytical group to the management of the plugging section.

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FUELS

IMPROVED WELL REPAIR REDUCES IDLE TIME

Kazan' SOVETSKAYA TATARIYA in Russian 11 Jun 81 p 1

[Article by M. Galiyev, head of oil field No 1 of the oil and gas extracting administration "Leninogorskneft'": "Wells Remain in Operation"]

> [Text] Under conditions where practically all oil extraction is done by mechanized method, the basis for successful fulfillment of the plans is the efficient use of the well fund, high quality of repair of the underground and surface equipment, and competent and high-quality maintenance.

Our field has done a lot in this area. The underground repair service has been reinforced and a number of other measures have been taken. They have promoted an increase in labor productivity in underground repair, improvement in its quality, and reduction in the number of wells waiting for repair. Well idle time nevertheless remained significant for a lengthy period and reached 6% for our field.

There is no doubt that it was impossible to tolerate this. The collective of our field, jointly with the brigades of underground well repair that service us started the initiative: "All wells into the fund of the operating!" It was approved by the "Tatneft'" association and the obkom of the trade union of oil and gas industry workers, and was embraced by all the oil workers.

We have been thoroughly studying the causes for well breakdown since the first days of the start of the initiative. The oil field workers found that one of the main causes is paraffin-coating of the pumping-compressor pipes and hoses. We tested different methods to prevent paraffin build-up. The most successful was washing the wells with hot oil and fractions obtained in the units of comprehensive oil preparation. The volume of this work is continually rising. Whereas we previously performed 12 well washings every month, in 1980 this number was brought to 25 per month. This resulted in a 2-fold reduction in the number of wells needing repair because of paraffin-coating.

On the other hand, thorough study of the wells which were prone to paraffin build-up made it possible to compile an individual, nearly optimal schedule for preventive maintenance of each of them. Analysis of well operation and study of the causes of their breakdown also demonstrated that oil extraction can be increased here as well. It was found that the duration of the unit operation depends a lot on the quality of well assimilation after underground repair. We developed a technique for

well assimilation, trained the personnel and set up special groups to assimilate the wells after repair. All of this essentially eliminated well breakdown because of poor-quality assimilation.

The comprehensive approach to search for and actuate the reserves for improvement is being used in all areas. It has become a tradition in our field to hold monthly meetings with the participation of the representatives from the shops of the production maintenance base. These meetings summarize the work, analyze and reveal shortcomings, and plan specific measures. The bonus conditions for the workers from the underground repair shop have been developed and are in force in order to increase the material interest in improving repair quality, increasing the interrepair period of wells, and reducing the idle fund.

Purposeful work to reduce the idle fund yields good results. Idling of wells waiting for underground repair has essentially been eliminated. It has become possible to conduct advance preventive maintenance before the equipment breaks down. Four years have passed since the birth of the initiative. During this time, our most senior collective of the administration, having a well fund with high flooding, achieved stable oil extraction.

The interrepair period of well operation has significantly improved in the elapsed time. Whereas in 1977 the interrepair period for centrifugal loading pumps was 199 days and 310 days for the sucker-rod pumps, today it has reached 392 and 412 days respectively. Our field reached this result for running each well without repair for an average of more than 1 year for the first time in its entire existence.

Special attention was paid to the wells equipped with electric centrifugal pumps, since they provide the main oil extraction. We have also made definite progress in this area. In 1980, for example, there were 126 of these wells. This is 8 more than the previous year. Despite this, the number of all repairs diminished by 57 in 1980, including repeated by 12, and premature by 14. Our field eliminated the concept "repair of the centrifugal pumps because of incorrect selection of equipment and assimilation of the well" a long time ago.

We have significantly increased the volume of geological and technical measures in order to improve oil extraction and for unconditional fulfillment of the plan. These measures were taken at 57 wells during the 4 months of this year. This increased oil extraction by 250 tons per day. For comparison, work was done on 52 wells in the same period of last year, and the increase in oil extraction was 48 tons per day.

When the initiative was adopted, our collective committed itself to bringing the idle well fund waiting for underground repair and in repair to 2.5% of the operational fund, and to achieve an additional daily 50 tons of oil as a result. We can boldly say today that our collective is successfully coping with its commitments. Our oil field workers have extracted over 100,000 tons of oil during the period of the initiative through reduction in the number of idle wells.

9035
CSO: 1822/1

DELAYS IN COAL DELIVERY CAUSED BY RAILROAD CAR SHORTAGE

Moscow GUDOK in Russian 23 Sep 81 p 1

/Article by V. Sbitnev, GUDOK correspondent, Krasnoyarsk: "GUDOK's Fuel Dispatch: Disruptions in the Coal Conveyor"/

/Text/ Since the beginning of the year coal loading on the Krasnoyarsk Railroad has been handled rather well. This is shown by the fact that the work results for the first and second quarters has earned the collective of the railroad line, for which coal is one of the most important kinds of cargo, the Challenge Red Banner of the USSR Ministry of the Railways and the Trade Union Central Committee. The railroad began the second half of the year with a surplus equal to nearly a half million tons of fuel. But August has passed and for the first time in many months the plan for this key indicator is unfulfilled.

September was also a bad month for the railroad. Thousands of tons of the fuel was undersupplied by the Krasnoyarsk division. The consumers of coal from Khakasiya did not receive their full delivery from the Abakan division. It is not just the railroad workers but the coal industry workers as well who are responsible for the disruptions in planned assignments. Here is just one example. On 15 September 400 of the very scarce gondola cars were not made available at the basic coal loading station of Chernogorskiye Kopi at the assigned times. This is the number of gondola cars required by the coal industry workers at this station for a 48 hour period..

The above-norm idle time of empty cars is making an already tight situation with loading resources worse. From the beginning of the month the railroad has been chronically undersupplied with gondola cars from neighboring railroads. Although the situation has somewhat improved in the past several days, the total result is a loss: from the east in the direction of Tayshet more than 200 gondola cars have failed to materialize; from the west through Mariinsk the figure is 800.

At this point it is necessary to make one reservation. The neighboring Kemerovo Railroad is providing the Krasnoyarsk Railroad empty cars by means of a total account, so to speak: the number of gondola cars that reach Mariinsk are then credited to fulfillment of the regulatory assignment. As a result the Krasnoyarsk railroad workers are underestimating the number of gondola cars needed for coal by several hundred.

How can this be? There is no secret involved. Through Mariinsk to Krasnoyarsk 2,660 gondola cars were to have been supplied for the two week period. Only 2,223 have been received. The shortage is apparent. But 427 of the cars that were not received were called "their own" by the dispatchers. Of course, these cars are not the personal property of the Kemerovo Railroad; they were sent to the Krasnoyarsk workers by someone to pick up Krasnoyarsk timber and are not subject to being loaded with fuel. Here is what happens: the regulatory assignment is nearly complete, but there is nothing in which to ship coal.

At present only the Achinskoye division is confident of fulfilling the month's assignment. I called the division and was answered by the senior dispatcher, A. Korzh. His voice was cheerful: "The Nazarovo station has shipped more than 30,000 tons in excess of the state plan, although at the end of the first ten-day period we experienced difficulties with empty cars. The Dubinino station has shipped almost the same amount; Dubinino ships coal from the Berezovskiy open pit mine of the Kansk-Achinsk fuel and power complex.

The volume of fuel extraction at the well-known KATEK /Kansk-Achinsk Fuel and Power Complex/ is not yet great - less than a million tons per year. But even with this amount the railroad workers on the Achinskoye division have their share of problems because the development of the track system is proceeding very slowly in this area.

For example, the rail approach to the open pit mine was built to handle no more than ten railroad cars per 24-hour period, and they are now loading more than 30. The division of the railroad has been forced to maintain its own diesel locomotive here. Railcar demurrages frequently exceed the established norm. The small Dubinino station is located in the midst of new construction and is experiencing increasing difficulties in processing freight. This includes forwarding Berezovskiy fuel to customers.

8927
CSO: 1829/16

CALL FOR USE OF SOLAR AND WIND POWER

Baku VYSHKA in Russian 3 Sep 81 p 4

/Article by I. Vekilova: "Sun and Wind in the Service of Man: Horizons of Science"/

/Text/ If one were to gather the energy of the sun's rays that fall during the summer time within the geographic latitude of the city of Baku, then in just one hour of bright sunlight one could obtain the same amount of energy that 10,000 tons of conventional fuel produces during combustion. Throughout just one full day of sunshine this adds up to nearly 50,000 tons.

Science is already aware of the methods for converting solar energy. They also know of practical uses of this energy. A small village high in the mountains near Ladakkh in Northern India is now called the solar village. This populated point is fully electrified through the use of solar energy.

It all boils down to: by what amounts and methods can we use our generous daily source of light in order to be more zealous in regard to mineral fuel. We are thinking of coal, natural gas, oil, wood and so forth.

"For many centuries man's thoughts have been directed in this direction," says the manager of the laboratory of wind energy of the sector of radiation research and the manager of the scientific post "solarfication and wind energy" of the Azerbaijan SSR Academy of Sciences, Doctor of Physics and Mathematical Sciences, Gabib Dzhafarovich Mamedbeyli. "Quite a few solar energy convertcrs have been created which can convert solar energy into thermal energy. Until recently the most successful of these convertors was thought to be the so-called "hot box", which was a sort of solar ray trap. Metal sheets, shavings, water and so forth were used as collectors.

The research, which was performed by Azerbaijan scientists in creating new solar water heaters, demonstrated that sea or river sand was best for these purposes. It collects heat twice as actively and retains it much better. In addition this method is much more economical. The sand solar water heater of the Azerbaijan scientists has been patented with the USSR State Committee for Inventions and Discoveries of the USSR Council of Ministers.

Extended tests at testing facilities and at hothouse facilities have shown that the device makes it possible to heat water in January to 41 degrees and in the summer to nearly the boiling point.

Years passed. And what was the fate of this innovation - PSV (as it is called in abbreviated form)? In 1972 this device won gold and silver medals at the USSR Exhibition of National Economic Achievements. At the testing facilities of the former scientific council on the use of solar energy and wind energy a PSV has already been built that has a heating area of nearly 80 square meters. Due to the simplicity of the device, its low cost and, most important, its efficiency, it is one of the best. Six to seven months out of the year (and during a cold winter, of course, on clear days) it is capable of heating water to a temperature of 40 to 50 degrees. Within a year or two the cost is recovered. It can be used successfully on a large scale (in combination with a thermal heating boiler) for heating an entire housing project and for supplying hot water. For example, a microregion with a population of between 40,000 and 50,000 can obtain heat from a PSV unit that has a total of 5 to 6,000 square meters of heating area. This could save 5,000 to 6,000 tons of fuel.

And if we add the use of a PSV unit in kindergartens, laundries, in public dining facilities, on the roofs of large apartment buildings for supplying hot water, in bath houses (especially in the country, sovkhozes, kolkhozes, farms where fuel is hard to come by), at greenhouses where at times nearly 30 percent of plantings are lost due to their being watered with cold water, and at livestock farms.

To this it is necessary to add this perspective: solar power units are being used in desalinating sea water. In the Azerbaijan SSR there is a great need for fresh water - and there is a sea next to us. Azerbaijan scientists have drawn up a contract for scientific-technical cooperation with the Giprovodkhoz USSR Scientific-Research Institute for the creation of a comprehensive desalinization system using the PSV and other developments of the Azerbaijan SSR Academy of Sciences.

In a word, the sphere of use of these water heaters is broad. The extensive use of the PSV technology in the Azerbaijan SSR would provide an annual savings of several million tons of fuel.

The apparent value of this seemingly simple device has caught the attention of the USSR Gosenergonadzor /State Committee for the Supervision of Energy Resources/, which has since 1973 recommended that it be adopted. Somewhat later the USSR State Committee for Science and Technology in one of its decrees of the scientific council on the problem of "power and electrification" thought it advisable to continue the work of the Azerbaijan scientists on a solar hot water supply system.

The sand solar water heater has been approved by several Azerbaijan organs, including the Ministry of Local Industry. Many decisions on adoption have been brought forth. All the same the unit, which has undergone successful testing, is with great difficulty winning the right to be adopted on an extensive basis. At present the PSV unit is in use outside of the Azerbaijan SSR more than it is within.

And what about us? The organization of the series production of the PSV unit at the Udzhary metal articles plant is still dragging along, in spite of the fact that the design of the water heater has already been approved. And this is the main problem - upon its solution hinges the extensive adoption of these simple, inexpensive and reliable solar water heaters into our daily lives and into the national economy. Apparently the Azerbaijan SSR Ministry of Local Industry needs to be more decisive in taking steps to speed up the production of the PSV unit at the Udzhury plant.

The possibilities of the sun are unlimited. What about the wind? The energy of wind currents is generally used through wind motors. As early as 1971 G. Mamedbeyli's group tested a two-meter jet wind motor, which produces electric power. And in 1977 the manufacture of a basically new wind motor, the "Apsheron", which was subjected to successful laboratory testing, was completed. Wind motors can be installed along irrigation canals for watering sovkhoz and kolkhoz fields. And if they are built along the sea coast, then in the northern regions of the Caspian Sea they could be used to lift sea water to a certain height, filling mountain cavities, and then releasing the water back into the sea, thereby producing electricity. In other words the wind motor would create a pumped water storage electric power station.

The Apsheron, where 300 days out of the year are windy, may serve as the basis for the "work of the wind". Such an electric power station is now operating in Dagestan in one of the scientific settlements.

G. Mamedbeyli says, "What if we were to install a wind motor in the place of an oil derrick rocker? To avoid the stoppage of the rocker on perfectly still days we could switch on a spare electric motor. We cannot begin to count oil derricks. But we can estimate the advantage: in a 24 hour period a single rocker uses 120 to 240 kilowatt-hours; but the wind motor could easily handle the job while supplying free energy."

Not so long ago the Kirovneft' /Kirov Petroleum Production Association/ NGDU /oil and gas extraction administration/ evaluated the result of preliminary experiments on the operation of a new type of rocker-machine tool, the "GAMA", which was developed by a collective of scientists of the Azerbaijan SSR Academy of Sciences, AzINEFTEKHIM, and the enginners from the repair-mechanical plant of the Azerbaijan SSR Ministry of Housing and Municipal Services. The results of the tests demonstrated that the expenditure of energy for lifting oil from the depths can be reduced by a third; for this reason the use of wind motors of an average capacity in extracting oil is promising. In the future there is work to be done in improving this new type of rocker-machine tool.

"I also had to listen to the opinion of those who recognize the potential of the sun and the wind, but who are sceptical that this potential can be used today. However, the successful experimental results and existing experience in using the energy of the sun and wind must help to transcend, finally, this psychological barrier.

"To fulfill the extensive program for the economic and social development of the Soviet Union, planned for the 11th Five-Year Plan and until the year 1990, it is necessary to bring into production the enormous raw material, fuel and energy and other material resources. However, the extraction of raw materials and fuel is becoming increasingly expensive and the supplies of minerals cannot be replaced. In these conditions the most economical and rational use of all kinds of material resources acquires particular national economic importance." These lines come from the recent decree of the CPSU Central Committee and the USSR Council of Ministers "concerning strengthening the work in conserving and making rational use of raw materials, fuel and energy and other material resources."

This most complex task - supplying the energy for our enormous, rapidly developing national economy - must be solved reliably and for the distant future. To realize this task using only traditional methods, i.e., by increasing the extraction of oil, gas and coal, is not easy. We must make more extensive use of the non-traditional sources of energy, such as solar, geothermal, hydropower and wind energy.

8927
CSO: 1822/9

CALL FOR USE OF NATURAL GAS TO OPERATE MOTOR VEHICLES

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 6 Aug 81 p 2

/Article by P. Shevchenko and L. Sotnik, L'vov: "Gasoline Has a Competitor"/

/Text/ The aged GAZ-51's peers have long since ended up in the junkyard; but it is still running well after 21 years. K. Nesterets, a driver from the L'vov motor vehicle enterprise No 13065, has been driving the truck on a methane "diet" for as many years. Common natural gas serves as the fuel for the truck in place of gasoline. And this is the secret of the truck's longevity.

On city streets Nesterets is subjected to the curious glances of passersby. How can this be: a truck with a gas cylinder engine has become almost a museum piece. Nesterets well remembers that in the 1950's there were hundreds of such vehicles in L'vov. In the RSFSR there were more than 2,500 of them. As early as 1949 a decision was made to produce the gas cylinder vehicles and to establish a network of gas refill stations. But the rapid development of the oil refining industry, the high heat capacity of gasoline and the ease of refilling them pushed the gas cylinder vehicles into the "retro" category.

In truth, vehicles which operate on compressed natural gas require special attention. If you run out of fuel, you cannot go and get some in a bucket. You have to go to a gas refill station. And if you consider that there are only two such stations in all of the RSFSR - one in L'vov and one in Berdichev - then you have to stop and think before converting your vehicle to the methane "feeding".

There are other negative aspects: the capacity of the engine falls by 15 to 20 percent; the carrying capacity of the vehicle is reduced (the weight of one gas cylinder is 65 kilograms and there are from 5 to 8 cylinders in a set); the driving distance between refills is decreased by 200 to 250 kilometers; and at low temperatures it is more difficult to start the engine.

If we add up the minuses we conclude that the gas cylinder automobile does not have a promising future. But let us not be hasty with the verdict. At the motor transport enterprise No 13065, where there are

nine gas cylinder vehicles in use, it is estimated that the cost of shipping by trucks operating on natural gas is 4.7 percent below those running on gasoline. Figure it out for yourself: a liter of regular A-76 gasoline costs 15 kopecks, while a cubic meter of natural gas costs only 4.87 kopecks. This is where the savings come in.

If we carry the comparison further, it turns out that the natural gas fuel is more economical than gasoline according to other indicators as well. This was unconditionally accepted by the people who recently participated in an all-union seminar that was held in L'vov. The seminar was devoted to studying the experience of operating motor vehicles on methane. The following data, obtained by L'vov specialists, were used to support arguments in favor of using natural gas: the average run of gas cylinder vehicles between capital repairs was 65,000 to 75,000 kilometers; for gasoline operated vehicles these figures were 45,000 to 50,000 kilometers. The increase in intermediate repairs provides the L'vov motor transport enterprise with an annual savings of nearly 2,500 rubles. And this is accomplished with only an insignificant number of the gas cylinder vehicles!

Another example. The motor transport base of L'vov Railroad's track maintenance organization has been using gas cylinder vehicles for nearly 30 years; these vehicles have already covered more than one million kilometers. N. Kalashnikov, the auto base chief, reports that if it weren't for the gas cylinder vehicles the enterprise would have to use an additional 1,000 tons of gasoline. And that is only at such a small motor vehicle base. That is what methane can do!

Improving the structure of the fuel and energy balance is one of the main tasks of the five-year plan, required by the 26th Party Congress. It is no accident that Brezhnev emphasized in his report to the Congress that it is necessary to reduce the percentage of oil that is used for fuel by substituting natural gas and coal.

Methane possesses other advantages as well. Its use in motor transport as a fuel will make it possible, in the opinion of NAMI /Central Order of Labor Red Banner Scientific-Research Automotive and Motor Transport Institute/ specialists, to cut down on harmful emissions into the atmosphere: carbon monoxide 2 to 4-fold; and nitric oxide - 1.2 to 2-fold. To maintain the purity of the atmosphere this is a substantial amount.

By putting natural gas fuel into general use, one must select the least of the evils. Regarding the loss of capacity of the gas cylinder engines and the reduced carrying capacity - a fact remains a fact. But a special natural gas engine has not been created. For now a standard gasoline engine is used in the gas cylinder vehicles. The engines are only slightly modified to accomodate the new type of fuel. It is sad to admit, but no design work in this direction has been done. Specialists, for example, assert that it is adequate to raise the degree of compression in the combustion chamber by one or two units in order to compensate for the losses of capacity. The same is true of the loss of carrying capacity: at present everything is based upon

the weight of steel cylinders, although they could easily be replaced with light-weight, highly durable synthetic materials.

Of course, initially, when the network of gas refill stations is not developed, it is advisable, apparently, to produce motor vehicles with a universal engine. When there is no natural gas, switch the valve and "while in motion" convert the motor to gasoline. By the way, this is how things are done in several automobiles at the L'vov enterprises. But we cannot uncover all of the advantages of the gas cylinder vehicles with such half-measures. Even now, when the big job is just getting underway, it is important not to lose one's perspective and to build the foundation carefully and reliably.

According to a decision that has been made, as early as next year 5,000 motor vehicles are to be switched to a natural gas fuel. In the final year of the five-year plan this number is to be increased to 100,000. It has been clearly determined who is to do what to accomplish this.

Even now it is important for each motor vehicle organisation to do a good job of preparing to operate in the new conditions. In L'vov Oblast the administration of freight-carrying motor transport, for example, has already solved the question about creating a special subdivision--a laboratory on the efficient use of gas cylinder vehi cles. Research results will help the designers to come up with engine designs and the practical workers to acquire experience in operating them. The number of motor vehicles which will be re-equipped to operate on compressed natural gas has already been clearly determined. By the end of the five-year plan the highways of L'vov Oblast will have 600 gas cylinder vehicles. The motor transport workers will receive the majority of them. These workers are engaged in delivering products to the stores of the cities.

It is necessary to more boldly switch transport to natural gas fuel. The CPSU Central Committee and the USSR Council of Ministers in a recent decree recognized the need to do everything possible to improve all work in conserving and making rational use of raw materials, materials, fuel and energy in all links of the national economy. These organs required us to direct scientific-technical and structural policy and the policy of capital investments toward this goal.

8927
CSO: 1822/9

BRIEFS

SOLAR ENERGY--Chimkent. In the village of Abay, Kelesskiy Rayon, work has gotten underway to build a kindergarten. The building will be supplied with a solar hot water system for domestic needs and heating. The use of solar energy will make it possible to get by without the services of the boiler facility for more than eight months out of the year. The extensive use of solar power plants is becoming one of the basic trends of the Yuzhgorsel Design Institute in preparing the plans for the layout of rural populated areas. House plans are being drawn up in which the sun will become a helper to people. /Text/ /Moscow PRAVDA in Russian 14 Sep 81 p 3/ 8927

ELECTRICITY FROM BENEATH G R O U N D--The first geothermal electric power stations in the European portion of the USSR are in Stavropol', Dagestan and the Transcarpathians; this is true even though there are no geysers and the ground is not broken by the puffing of steam, the roar of boiling water fountains escaping upward. There are two such electric power stations in the Soviet Union - Pauzhetskaya and the Paratunskaya, with capacities of 11,000 and 700 kilowatts respectively. Both of them are in Kamchatka, or, as they say, in a region of active volcanic activity. There, where there is a lot of water near the surface of the earth, it gushes forth at a high pressure and its temperature is most suitable - 250 degrees. It is only necessary to separate the water and feed the dry steam to the turbines of the electric power stations. But we have such unique regions only in Kamchatka and on the Kurile Islands. But inexpensive energy is needed everywhere. Science is now actively searching for such energy. Here is one of the conclusions that scientists have reached: geothermal electric power stations similar to those in Kamchatka can be built in many other places within the Soviet Union. Professor R. Akhmedov, deputy director of the Scientific-Research Energy Institute imeni G. M. Krzhizhanovskiy, says, "We have known for a long time that the temperature rises by three degrees for every 100 meters that we go into the earth. In principle, one can drill a sufficiently deep well to reach the needed temperature. Pump water into this "hot boiler", dig a second well next to the first and use explosives to join the two. The cold water, which is pushed into the first well is then transferred into the "hot boiler", heated to the desired temperature, and then forced out of the ground through the second well. In this manner we get a geyser that closely resembles what we have in Kamchatka." But for this to work the wells must be extremely deep. This is expensive and at times disadvantageous. This is

why we are searching for so-called thermal anomalies, where the temperature rises by 30 to 40 degrees for every 100 meters that we go into the earth. There are many such places in the Soviet Union. And at almost all of them one can artificially create the "volcanic" conditions of Kamchatka and build economical electric power stations. At present in Dagestan, Stavropol' and in the Transcarpathians for the first time at selected sites they have already started to build three small geothermal electric power stations, or to be more precise three 10-megawatt power units. They differ from those in Kamchatka. Local conditions dictate a new type of power station. One must worry about what water pressure and temperature should be maintained. And one has to worry about the supply of underground water, which is not so abundant here. For this reason provision has been made for a system of forced water recycling. These small power stations are primarily being built for careful study and for checking all parameters. For it these stations - the first of the new type of geothermal electric power stations - which will make it possible to proceed to the construction large power stations with a capacity of up to 200 megawatts and greater. And not just at these locations, but also in Central Asia, the Baltic area and in the center of the Russian republic. According to an evaluation of scientists, by the end of this century geothermal electric power stations can provide five percent of the total electricity produced in the Soviet Union. /Text/ /Moscow IZVESTIYA in Russian 21 Aug 81 p 6/ 8927

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24 Nov 1981